SUGAR MANUAL—1977

A Handbook of Statistical Information

Hawaiian Sugar Planters' Association

HSPA
SUGAR MANUAL 1977

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Hawaiian Sugar Planters' Association

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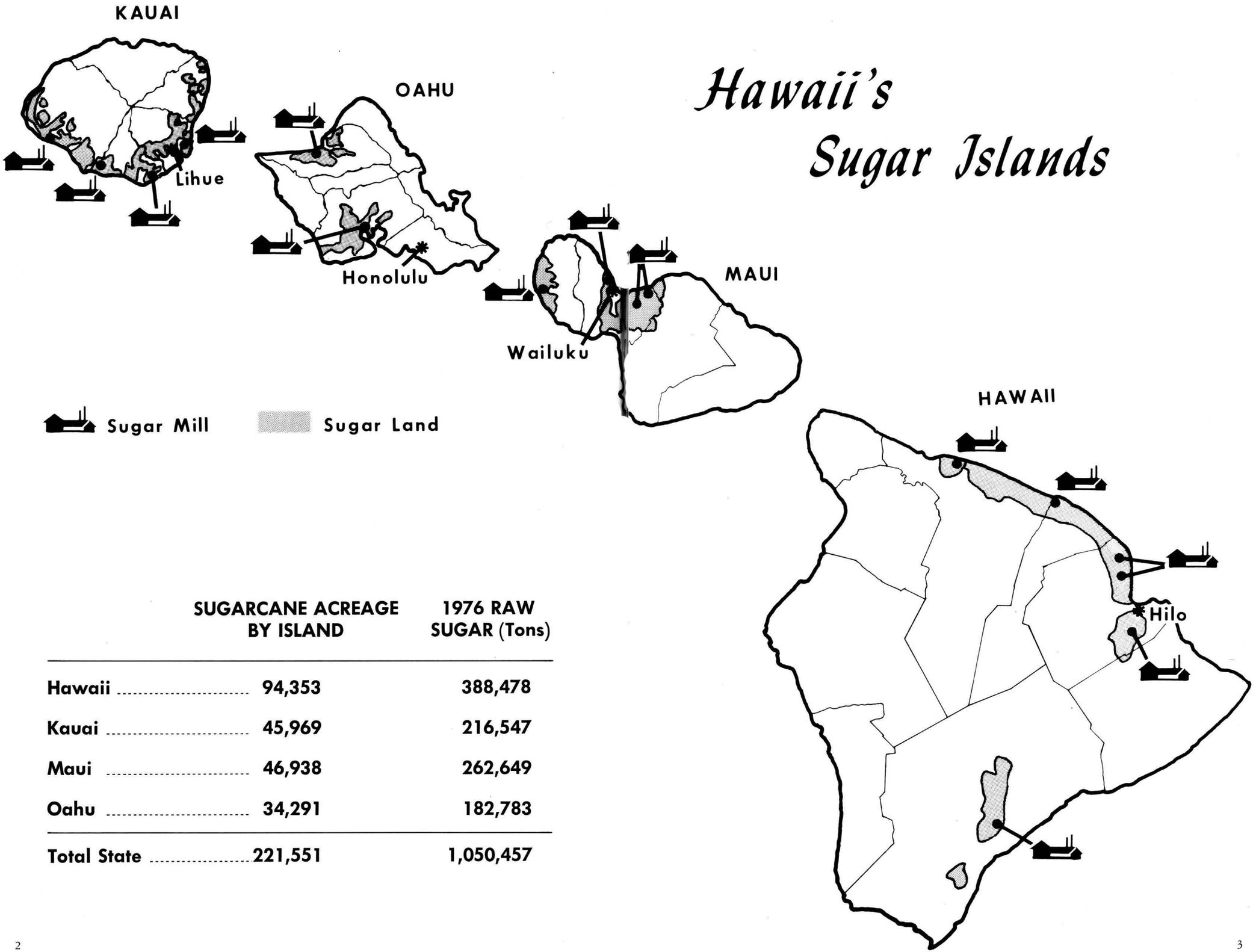


	SUGARCANE ACREAGE BY ISLAND	1976 RAW SUGAR (Tons)
Hawaii	94,353	388,478
Kauai	45,969	216,547
Maui	46,938	262,649
Oahu	34,291	182,783
Total State	221,551	1,050,457

HAWAIIAN SUGAR COMPANIES

ISLAND OF KAUAI

GAY & ROBINSON
Makaweli, Kauai 96769
Phone: 338-8233

KEKAHA SUGAR CO., LTD.
T. J. O'Brien, *Pres. & Mgr.*
Kekaha, Kauai 96752
Phone: 337-1472

THE LIHUE PLANTATION COMPANY, LTD.
L. A. Faye, Jr., *Pres. & Mgr.*
Lihue, Kauai 96766
Phone: 245-2112

MCBRYDE SUGAR CO., LTD.
P. F. Conrad, *V.P., Mgr.*
Eleele, Kauai 96705
Phone: 335-5333

OLOKELE SUGAR CO., LTD.
R. F. Cameron, *V.P., Mgr.*
Kaumakani, Kauai 96747
Phone: 335-5337

ISLAND OF OAHU

OAHU SUGAR CO., LTD.
D. W. Ballie, Jr., *Pres., Mgr.*
Waipahu, Oahu 96797
Phone: 677-3577

WAIALUA SUGAR CO., INC.
W. W. Paty, Jr., *Pres., Gen. Mgr.*
Waialua, Oahu 96791
Phone: 637-4520

ISLAND OF MAUI

HAWAIIAN COMMERCIAL & SUGAR COMPANY
W. S. Haines, *Mgr.*
Puunene, Maui 96784
Phone: 877-0081

PIONEER MILL CO., LTD.
W. G. Hall, *Pres., Mgr.*
Lahaina, Maui 96761
Phone: 661-0592

WAILUKU SUGAR COMPANY
I. W. Bowman, *V.P., Mgr.*
Wailuku, Maui 96793
Phone: 244-9570

ISLAND OF HAWAII

HILO COAST PROCESSING CO.[1]
D. J. Martin, *Pres., Gen. Mgr.*
Pepeekeo, Hawaii 96783
Phone: 963-6211

HONOKAA SUGAR COMPANY
P. E. Bouvet, *V.P., Gen. Mgr.*
Paauhau, Hawaii 96775
Phone: 775-7261

KA'U SUGAR CO., INC.
T. H. Inglett, *V.P., Mgr.*
Pahala, Hawaii 96777
Phone: 928-8311

LAUPAHOEHOE SUGAR CO.
F. C. Schattauer, *V.P., Mgr.*
Papaaloa, Hawaii 96780
Phone: 962-6314; 962-6244

MAUNA KEA SUGAR CO., INC.[2]
T. B. Crabb, V.P., *Mgr.*
Papaikou, Hawaii 96781
Phone: 964-1025

PUNA SUGAR CO., LTD.
J. T. Humme, *Pres., Mgr.*
Keaau, Hawaii 96749
Phone: 966-9270

[1]Sugarcane milling company cooperatively owned by United Cane Planters Cooperative and Mauna Kea Sugar Co.
[2]Mauna Kea Sugar Company is a grower which delivers its cane to Hilo Coast Processing Co.

Part I

HAWAII'S SUGAR INDUSTRY

Although Hawaii had predominantly an agricultural economy for more than 100 years, events since World War II have changed the principal basis from agriculture to tourism and military expenditures.

In 1976, the Hawaiian economy received $1.45 billion in direct tourist expenditures and over $1 billion in federal expenditures.

Sugar ranked third in income for the State, bringing in an estimated $257 million.

Pineapple was the fourth largest income producer in the State and added about $126 million to the local economy for the 1975-76 pack year.

Diversified agriculture in the State delivered an additional $119 million worth of farm products to markets in and out of Hawaii.

Because Hawaii must import most of her food and other essentials from the U.S. Mainland, the out-of-state shipments of sugar and fresh or canned pineapple products are important in the State's balance of trade.

SUGAR INDUSTRY

Hawaii's sugar industry is recognized as one of the world's leaders in sugar technology and production.

Sugarcane was growing in Hawaii when the Islands were discovered by Capt. James Cook in 1778. Although there may have been earlier attempts to produce sugar from the sugarcane, the first actually documented crushing of sugarcane was by a Spaniard, Don Francisco de Paula Marin in Honolulu in 1819. In March of that year he noted in his diary that he extracted juice from the sugarcane.

The first actual plantation in Hawaii was started in 1825 in Manoa on Oahu, but this venture failed.

In 1835, a plantation was started at Koloa on the island of Kauai, and these fields are still growing sugarcane today.

The first sugar was produced at the Koloa plantation in 1837 according to reports which showed 5,039 pounds of sugar and 400 gallons molasses sent out by ship.

Sugarcane plantations spread throughout the Kingdom of Hawaii. In 1886, production was 100,000 tons, the 250,000 ton mark was reached in 1897 and in 1908, production was 500,000 tons.

Production reached more than one million tons in the 1930-31 sugar year. In 1976 a total of 1,050,457 tons of sugar and 275,352 tons of molasses were produced in Hawaii.

GROWING SUGAR IN HAWAII

Hawaii's sugar industry is unique among the sugarcane growing countries of the world. It is the only area where the average age of sugarcane is two years at the time of harvest.

Hawaii's sugar industry is one of the most highly mechanized in the world. Hand labor has been virtually eliminated.

The climate of Hawaii varies considerably. Tropic rain forests can be found within a few miles of desert conditions.

On some sugar lands average rainfall is as low as 15 inches a year. On others, the rainfall is as high as 212 inches a year. One sugar company reported that its mountain fields receive an average of 133 inches of rain a year while its fields near the ocean shoreline receive only about 20 inches.

Because of the lack of adequate rainfall in some areas, about half of Hawaii's sugar lands must be irrigated.

The irrigated fields produce about two-thirds of the total Hawaii sugar produced each year. Scientists and engineers are constantly seeking new and better ways to use the irrigation water such as the recently developed drip irrigation system. The water systems, including many miles of tunnels, dikes and ditches, were designed and built by the sugar companies without any governmental assistance or contributions.

PLANTING AND HARVESTING

Sugarcane is planted by using pieces of cane stalks as "seed." These seed pieces are cut from growing sugarcane.

Sugarcane is planted by machines which drop the sugarcane pieces in rows and then cover the pieces with soil.

About half of Hawaii's sugar lands are harvested each year. When sugarcane is harvested, it grows again from the old stubble left in the ground. From two to four ratoon crops are obtained from each original planting. Then the field is plowed again and replanted with new seed pieces.

The fields are burned before harvesting to get rid of the dried leaves matted in the fields. The burning does not harm the sugarcane stalks and it cuts down on the amount of useless leaves and trash that would otherwise be sent through the sugar mills. The burning also helps in pest control for the fields.

After the fields are burned, mechanical harvesters are used. These push the cane into windrows where giant grab cranes load the cane into tractor-trailers which haul the cane to the mill for processing into raw sugar.

Some plantations use a V-cutter, which has a v-shaped blade with a vertical cutting wheel at the front. The cane cut by this machine is also loaded with grab cranes after it is picked up and taken to the edge of the field.

Newer developments include mechanical har-

vesters now being used by some non-irrigated plantations. These harvesters cut the cane, chop it into short lengths and use forced air to blow much of the trash and soil from the cane. Engineers are seeking new ways in which cane can be harvested and cleaned more efficiently.

RAW SUGAR TO THE U.S. MAINLAND

Approximately 97 percent of all Hawaiian raw sugar is shipped to the U.S. Mainland for refining. In 1976, about five percent was processed into refined sugar at the California and Hawaiian refinery in Aiea, Hawaii, primarily for Hawaiian consumption.

All Hawaii raw sugar is transported in bulk form. The bulk sugar is loaded on ships from bulk terminals at Kahului, Maui; Hilo and Kawaihae, Hawaii; Honolulu, Oahu; and Nawiliwili on Kauai.

In 1976, the shipment of raw sugar from Hawaii to the mainland accounted for 53 vessel sailings.

SUGAR SHIP SAILS THE SEAS

The MV Sugar Islander, largest oceangoing bulk cargo carrier ever built in a U.S. shipyard, made its first visit to Hawaii in September 1973.

The $17.3 million ship is under charter to California and Hawaiian Sugar Co. She carries Hawaii-produced raw sugar to the Mainland and returns to Hawaiian or other Pacific area ports with grains. The ship is 641 feet long and 77 feet wide at her widest point. She has a capacity of 28,115 long tons.

The Sugar Islander was built by Lockheed Shipbuilding and Construction Co.

HAWAIIAN SUGAR COMPANIES BY ISLANDS, WITH ACREAGE AND PRODUCTION FOR 1976
(Raw Value)

	Total Caneland Acreage	Acreage Harvested	Production (short tons)
HAWAII			
Hilo Coast Processing Co. (Processor only)			131,875[1]
Mauna Kea Sugar Co. (Grower only)	17,517	8,340	.....[1]
United Cane Planters Coop. (Grower only) (383 member-growers)	7,820	3,919	.....[1]
Honokaa Sugar Co.	16,631	6,810	64,327
Ka'u Sugar Co., Inc.	17,873	4,871	55,634
Laupahoehoe Sugar Co.	18,838	8,062	78,405
Puna Sugar Co., Ltd.	15,674	6,890	58,237
TOTAL HAWAII	94,353	38,892	388,478
KAUAI			
Gay and Robinson (Grower only)	2,691	1,269	17,384[2]
Kekaha Sugar Co., Ltd.	7,861	3,875	45,120
The Lihue Plantation Co.	17,438	8,446	71,771
McBryde Sugar Co., Ltd.	13,171	6,326	53,640
Olokele Sugar Co., Ltd.	4,808	2,304	28,632
TOTAL KAUAI	45,969	22,220	216,547
MAUI			
Hawaiian Commercial & Sugar Co.	32,340	15,085	185,405
Pioneer Mill Co., Ltd.	9,157	4,494	48,425
Wailuku Sugar Co.	5,441	2,650	28,819
TOTAL MAUI	46,938	22,229	262,649
OAHU			
Oahu Sugar Co., Ltd.	18,842	9,355	103,086
Waialua Sugar Co., Inc.	15,449	7,230	79,697
TOTAL OAHU	34,291	16,585	182,783
TOTAL—ALL ISLANDS	221,551	99,926	1,050,457

[1]93,088 tons attributed to Mauna Kea Sugar Co. 38,787 tons attributed to United Cane Planters Coop.
[2]Gay & Robinson sugarcane milled by Olokele Sugar Co., Inc.

AVERAGE RAW SUGAR PRICE, AVERAGE DAILY EARNINGS FOR NON-SUPERVISORY EMPLOYEES, AVERAGE NUMBER OF ADULT HOURLY RATED EMPLOYEES, AND TOTAL MAN-DAYS ALL HOURLY RATED EMPLOYEES ON HAWAIIAN SUGAR PLANTATIONS

	Average New York Raw Sugar Price cwt. (Hawaiian Basis)[1]	*Average Daily Earnings*[2]	*Adult Hourly-Rated Employees*[3]	*Total Man-Days Hourly-Rated Employees*
1940	2.78	2.180	35,062	9,994,863
1941	3.39	2.479	30,646	8,870,704
1942	3.74	2.900	26,371	7,923,641
1943	3.74	3.590	23,847	7,562,690
1944	3.74	3.910	22,543	7,062,227
1945	3.75	5.100	20,806	6,350,489
1946	4.59	5.275	22,131[4]	5,247,294[4]
1947	6.22	7.632	22,743	6,443,424
1948	5.56	8.024	21,381	5,820,806
1949	5.81	8.040	20,258	5,437,839
1950	5.93	8.300	19,340	5,069,682
1951	6.06	9.000	18,654	4,894,004
1952	6.26	9.700	18,193	4,653,898
1953	6.29	10.200	17,589	4,386,554
1954	6.09	10.580	16,773	4,163,264
1955	5.95	10.62	15,935	3,896,761
1956	6.09	10.73	15,065	3,646,860
1957	6.25	11.20	14,085	3,457,428
1958	6.27	12.78	13,304[5]	2,333,527[5]
1959	6.24	12.84	12,755	3,082,207
1960	6.31	13.18	12,111	2,917,459
1961	6.30	14.11	11,660	2,787,714
1962	6.45	14.96	10,960	2,675,974
1963	8.20	16.68	10,722	2,582,706
1964	6.90	17.60	10,516	2,593,094
1965	6.75	18.40	10,346	2,505,839
1966	6.99	19.76	10,040	2,447,554
1967	7.28	21.35	9,756	2,346,197
1968	7.52	21.62	9,481	2,282,654
1969	7.75	23.26	9,213[6]	2,066,244[6]
1970	8.08	24.24	8,908	2,139,183
1971	8.52	26.08	8,610	2,077,011
1972	9.10	29.09	8,127	1,934,563
1973	10.30	30.86	7,900	1,897,369
1974	29.43	34.41	7,700[7]	1,744,346[7]
1975	22.49	37.34	7,800	1,937,973
1976[2]	13.31	43.12	7,500	1,854,272

[1]Hawaiian basis is the average New York raw sugar price computed over all the days in the year. The New York price is computed for days the New York market is operating. Local sugar land leases are based on the Hawaiian basis rather than the New York basis.

[2]Cash wage only. Does not include "employee benefits" which amounted to $17.28 a day in 1976.

[3]Prior to 1947 included only male adults.

[4]1946: industry-wide strike, 2½ months.

[5]1958: industry-wide strike, 4 months.

[6]1969: industry-wide strike, 5 weeks.

[7]1974: industry-wide strike, 6 weeks.

WAGES, HOURS & WORKING CONDITIONS

Sugar company production employees work in 11 labor grades. Current (June 1977) Grade 1 rate of pay is $4.19 an hour. Grade 11 employees earn $6.325 an hour. Work performed in excess of 40 hours is paid for at premium rates.

The contract with the ILWU expired January 31, 1977 and an extension through October 1977 was negotiated with the same wage rates as in the prior contract.

Unlike most farming areas which are seasonal and rely on migratory labor, Hawaii's sugar industry provides year-round, long-term employment. Sugar operations are conducted on a 12-month basis.

Production and maintenance employees at 14 of the State's 15 sugar companies are organized by the International Longshoremen's and Warehousemen's Union.

In 1976 the payroll for all Hawaii's sugar workers amounted to $110,000,000.

DAILY AVERAGE EARNINGS IN 1976

Wages	$43.12
Employee Benefits	17.28
Total	$60.40

EMPLOYEE BENEFITS

Year-round employees receive up to four weeks vacation with pay, nine paid holidays a year; paid sick leave for up to 54 days plus a temporary disability supplement for extended illness, medical plan, a dental care plan for dependent children, retirement pensions, severance pay and many other benefits.

APPROXIMATE EMPLOYMENT BY OCCUPATION AT SUGAR COMPANIES

Factory	1,200
Field	3,000
Motive Equipment	1,550
Construction & Surveying	170
Clerical	270
Trades	1,390
Miscellaneous	350
Supervisors	1,070
Total	9,000

SUGAR LANDS

The Hawaiian Islands make up the union's fourth smallest state. The islands are actually the summits of a chain of volcanic mountains, some of which are still active. Only certain lowlands near the coasts are tillable because of the rugged terrain and the character of the soils. The balance is forest, pasture and wasteland.

Hawaii's sugar companies are located along the coastlines of the four sugar islands and push upwards into the foothills and mountains.

Approximately 220,000 acres are devoted to growing sugar in Hawaii, with about 16,000 acres in mill sites, roads, irrigation systems, etc., or uncultivated land. This is equal to about 5 percent of total land area and about 9 percent of total private land.

More than half of the sugar lands are owned by the sugar companies. The balance is leased from government or private owners.

ISLAND LAND AREAS WITH SUGAR

Island	Extreme Length Miles	Extreme Width Miles	Area Square Miles[1]	Area Acres 000's	(1976) Total Cane Acreage[2]
Hawaii	93	76	4,038	2,584	94,353
Maui	48	26	729	466	46,938
Oahu	44	30	608	388	34,291
Kauai	33	25	553	354	45,969
Molokai	38	10	261	167	.....
Lanai	18	13	139	89	.....
Niihau	18	6	73	46	.....
Kahoolawe	11	6	45	28	.....
Minor Islands	....	....	4	2	.....
			6,450	4,128	221,551

[1]Includes land and inland water.
[2]Does not include mill sites, roads, etc.

HAWAII LAND OWNERSHIP

Hawaii land ownership of six largest islands in Hawaii.

Major Private Owners (more than 1,000 acres each)	58.0%
Hawaii State	34.6%
Federal Government	7.4%
	100.0%

Source: State of Hawaii Data Book, 1976.

LAND USED BY SUGAR COMPANIES*

Sugar Companies & Independent Grower Farms

Land Used By Sugar Companies	*Acreage*	*Total Acreage*
Owner in fee simple	137,840	
Leased from private owners or estates	93,807	
Leased from State of Hawaii	13,701	
		245,348
Land Used By Independent Grower Farms		
Leased from sugar companies	2,953	
Sub-leased from sugar companies	2,136	
Direct Ownership, or Leased from Other Sources	6,849	
Total		11,938
		257,286

*Includes attributable land (roads, reservoirs, mill sites and irrigation ditch systems) used for cultivation.

CANE SUGAR: PRODUCTION IN HAWAII

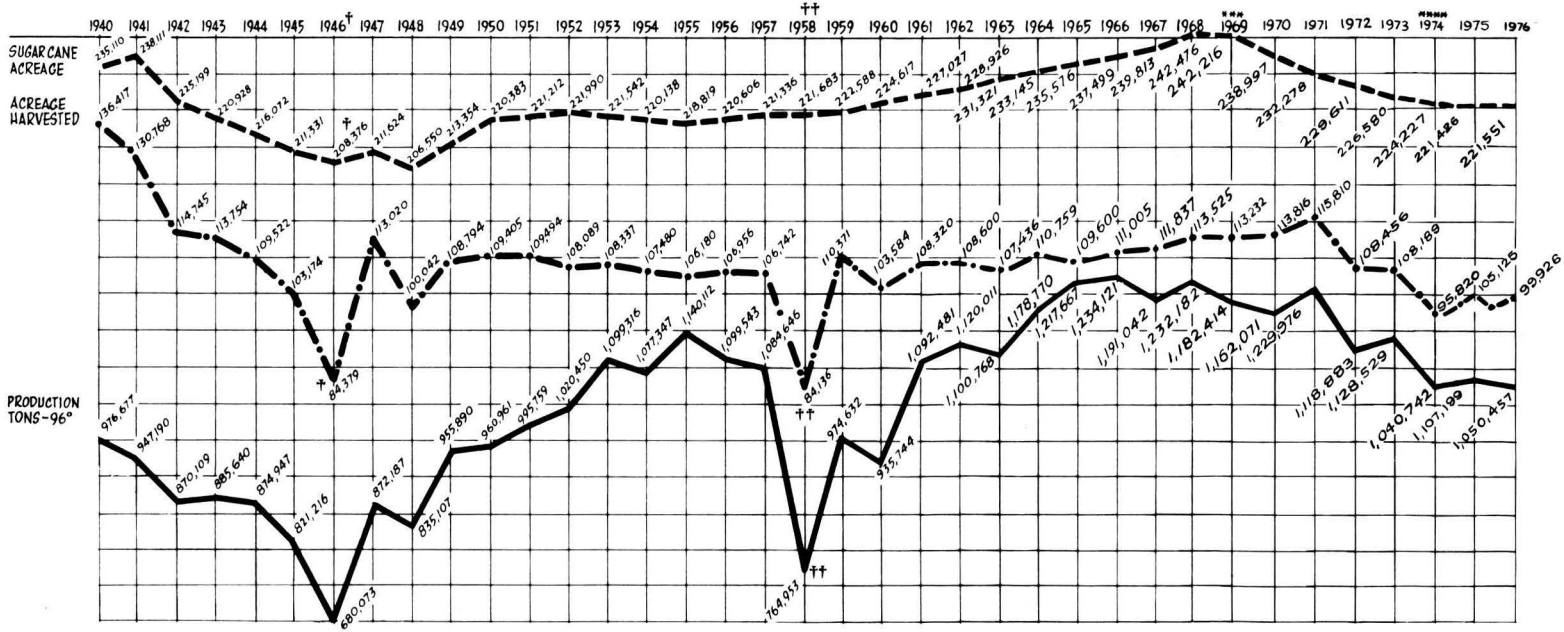
Production Year[1] (Beginning Oct. 1st, Ending Sept. 30th)	Tons sugar per acre	Tons cane per ton sugar	Total cane land area	CANE USED FOR SUGAR			SUGAR PRODUCED		Raw value 96° sugar made per short tons of cane	Molasses Production**
				Acreage harvested[2]	Average yield per acre	Production	Converted to 96° raw value[3]	Equivalent refined[4]		
			Acres	Acres	Short Tons	Short Tons	Short Tons	Short Tons	Pounds	
1908–1909	5.14	7.42	201,641	106,127	38.2	4,050,000	545,738	510,048	270	
1909–1910	4.81	7.78	209,469	110,247	37.4	4,122,000	529,940	495,282	257	
1910–1911	5.16	7.94	214,312	112,796	41.0	4,623,000	582,196	544,120	252	
1911–1912	5.34	7.75	216,345	113,866	41.4	4,711,000	607,863	568,109	258	
1912–1913	4.90	7.99	215,741	113,548	39.1	4,445,000	556,654	520,249	250	
1913–1914	5.54	8.01	217,470	112,700	44.4	5,000,000	624,165	583,345	250	
1914–1915	5.75	7.96	239,800	113,164	45.8	5,184,393	650,970	608,397	251	
1915–1916	5.17	8.14	246,332	115,419	42.1	4,859,424	596,703	557,679	246	
1916–1917	5.57	7.98	247,476	117,468	44.4	5,220,000	654,388	611,591	251	
1917–1918	4.86	8.34	246,813	119,785	40.5	4,855,804	582,192	544,117	240	
1918–1919	5.07	7.81	239,844	119,679	39.6	4,744,070	607,174	567,465	256	
1919–1920	4.91	7.98	247,838	114,105	39.2	4,473,498	560,379	523,730	251	
1920–1921	4.83	8.53	236,510	113,056	41.2	4,657,222	546,273	510,547	235	
1921–1922	4.98	8.23	228,519	124,124	41.0	5,088,062	618,457	578,010	243	
1922–1923	4.85	8.23	235,134	114,182	39.9	4,559,819	554,199	517,954	243	
1923–1924	6.42	7.91	231,862	111,581	50.7	5,661,000	715,918	669,097	253	
1924–1925	6.47	8.06	240,597	120,632	52.2	6,297,000	781,000	730,000	248	
1925–1926	6.58	8.07	237,774	122,309	53.1	6,495,686	804,644	752,020	248	
1926–1927	6.68	8.41	234,809	124,542	56.1	6,992,082	831,648	777,258	238	
1927–1928	7.00	8.37	240,769	131,534	58.6	7,707,330	920,887	860,661	239	
1928–1929	7.16	8.05	239,858	129,131	57.7	7,447,494	925,140	864,636	248	
1929–1930	7.02	8.36	242,761	133,840	58.7	7,853,439	939,287	877,858	239	
1930–1931	7.43	8.33	251,533	137,037	61.9	8,485,183	1,018,047	951,467	240	
1931–1932	7.57	8.38	251,876	139,744	63.4	8,865,323	1,057,303	988,155	239	
1932–1933	7.34	8.05	254,563	144,959	59.1	8,566,781	1,063,605	994,045	248	
1933 (Oct. 1 - Dec. 31)	.....	.....	.....	.....	.....	.....	127,317	118,990	.....	
1934*	7.14	8.33	252,237	134,318	59.5	7,992,260	959,337	896,596	240	
1935	7.82	8.67	246,491	126,116	67.8	8,555,424	986,849	922,309	231	
1936	7.97	8.80	245,891	130,828	70.1	9,170,279	1,042,316	974,149	227	
1937	7.46	9.32	240,833	126,671	69.5	8,802,716	944,382	882,619	215	
1938	6.92	9.39	238,302	135,978	65.0	8,835,370	941,293	879,732	213	
1939	7.18	8.66	235,227	138,440	62.2	8,609,543	994,173	929,154	231	
1940	7.16	8.76	235,110	136,417	62.7	8,557,216	976,677	912,802	228	
1941	7.24	9.04	238,111	130,768	65.5	8,559,797	947,190	885,244	221	
1942	7.58	9.10	225,199	114,745	69.0	7,918,342	870,099	813,195	220	
1943	7.79	9.24	220,928	113,754	71.9	8,185,400	885,640	827,719	216	
1944	7.99	8.95	216,072	109,522	71.5	7,832,185	874,947	817,725	223	
1945	7.96	8.98	211,331	103,173	71.4	7,371,158	821,216	767,509	223	
1946	8.06	8.83	208,376	84,379	71.1	6,002,127	680,073	635,596	227	212,230
1947	7.72	9.11	211,624	113,020	70.3	7,942,216	872,187	815,146	220	285,190
1948	8.35	9.03	206,550	100,042	75.4	7,542,613	835,107	780,491	221	254,740
1949	8.76	8.44	213,354	108,794	73.9	8,045,941	955,890[5]	893,375	238	251,500
1950	8.78	8.51	220,383	109,405	74.7	8,174,821	960,961[6]	898,114	235	259,130
1951	9.09	8.51	221,212	109,494	77.4	8,477,201	995,759	930,636	235	270,585
1952	9.44	8.52	221,990	108,089	80.4	8,693,920	1,020,450	953,712	235	259,360
1953	10.15	8.19	221,542	108,337	83.1	9,003,967	1,099,316	1,027,421	244	287,480
1954	10.02	8.75	220,138	107,480	87.75	9,431,781	1,077,347	1,006,889	228	306,910
1955	10.74	8.66	218,819	106,180	92.94	9,867,978	1,140,112	1,065,525	231	295,550
1956	10.28	9.01	220,606	106,956	92.65	9,909,990	1,099,543	1,027,633	222	305,580
1957	10.16	8.71	221,336	106,742	88.51	9,447,647	1,084,646	1,013,710	230	303,700
1958	9.09	9.87	221,683	84,136	89.77	7,552,750	764,953	714,925	203	307,210
1959	8.83	9.66	222,588	110,371	85.31	9,416,225	974,632	910,891	207	330,790
1960	9.03	9.20	224,617	103,584	83.15	8,613,317	935,744	874,546	217	299,590
1961	10.09	8.78	227,027	108,320	88.58	9,595,342	1,092,481	1,021,033	228	329,960
1962	10.31	8.76	228,926	108,600	90.36	9,812,580	1,120,011	1,046,762	228	335,510
1963	10.25	9.12	231,321	107,436	93.39	10,033,969	1,100,768	1,028,777	219	322,610
1964	10.64	8.90	233,145	110,759	94.76	10,495,175	1,178,770	1,101,678	225	336,250
1965	11.11	8.82	235,576	109,600	97.97	10,737,507	1,217,667	1,138,033	227	340,190
1966	11.12	8.89	237,499	111,005	98.82	10,969,925	1,234,121	1,153,409	225	349,540
1967	10.65	9.27	239,813	111,837	98.74	11,045,949	1,191,042	1,113,148	216	359,170
1968	10.85	9.15	242,476	113,525	99.36	11,279,920	1,232,182	1,151,597	218	368,050
1969	10.44	9.17	242,216	113,232	95.73	10,839,272	1,182,414	1,105,060	218	340,330
1970	10.21	9.00	238,997	113,816	91.88	10,457,377	1,162,071	1,086,000	222	322,480
1971	10.62	8.69	232,278	115,810	92.26	10,685,019	1,229,976	1,149,510	230	330,227
1972	10.32	8.87	229,611	108,456	91.55	9,929,068	1,118,883	1,045,708	225	307,543
1973	10.43	8.55	226,580	108,189	89.15	9,645,452	1,128,529	1,054,723	234	301,500
1974	10.86	8.73	224,227	95,826	94.76	9,082,684	1,040,742	972,677	229	293,380
1975	10.53	8.57	221,426	105,125	90.23	9,485,299	1,107,199	1,034,788	233	301,335
1976	10.51	8.73	221,551	99,926	91.79	9,172,649	1,050,457	981,757	229	275,352

1. From 1908-1933 acreage harvested represents summation of plantation crop years and does not necessarily correspond to the period Oct. 1 to Sept. 30.
2. The average growth of a crop is from 22 to 24 months. Only a portion of the total acreage in cane is harvested each year.
3. Converted in accordance with Sugar Regulations, Series 1, No. 1, U.S. Department of Agriculture, Agricultural Adjustment Administration, issued February 18, 1935, or Section 101(h) of the Sugar Act of 1948 or corresponding provisions of its predecessors, as the case may be.
4. 1 ton of sugar, 96° test is assumed to be equivalent to 0.9346 tons of refined.
5. Includes 2,369 tons raw sugar produced from volunteer cane for which no acreage shown.
6. Includes 2,690 tons raw value sugar produced from volunteer cane for which no acreage shown.

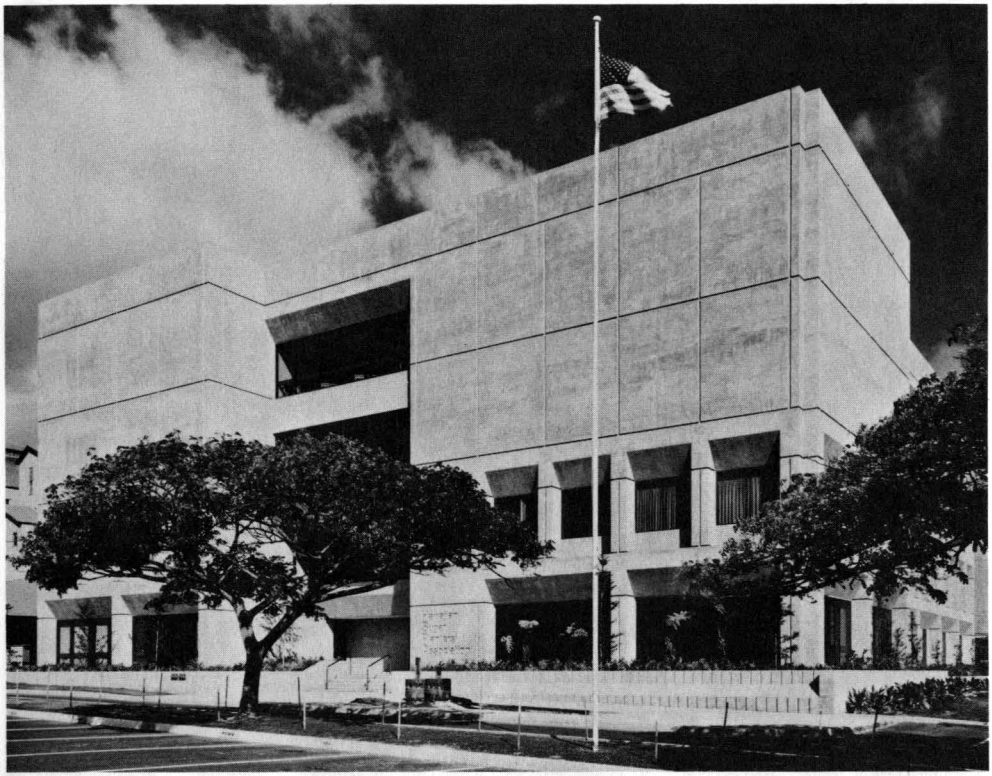
*Beginning in 1934, data are by calendar year.

**With this year's manual we are including for the first time molasses production from 1946 through 1976.

SUGARCANE ACREAGE, ACREAGE HARVESTED, AND PRODUCTION



* PRIOR TO 1947 INCLUDED ONLY MALE ADULTS
† 1946: INDUSTRY-WIDE STRIKE, 2½ MONTHS
†† 1958: INDUSTRY-WIDE STRIKE, 4 MONTHS
*** 1969: INDUSTRY-WIDE STRIKE, 5 WEEKS
**** 1974: INDUSTRY-WIDE STRIKE, 6 WEEKS



The Hawaiian Sugar Planters' Building in Aiea, Hawaii.

HAWAIIAN SUGAR PLANTERS' ASSOCIATION

The Hawaiian Sugar Planters' Association is a voluntary, non-profit, unincorporated association for "the maintenance, advancement, improvement and protection of the sugar industry in Hawaii, the support of an Experiment Station, and the doing of all such matters and things as shall be incidental to such purposes and objects."

Plantation members of the Association are those companies in Hawaii engaged primarily in the business of raising sugarcane and manufacturing sugar from it. Active members are elected from among individuals who are directly connected with the direction, management, or operation of the sugar companies.

The Association carries out many of its activities through standing committees and these are: Accounting, Environmental Standards, Industrial Relations, Insurance, Land and Water, Legislative, Public Relations, Tax, and Experiment Station Advisory.

EXPERIMENT STATION

The Association's largest program is the Experiment Station which conducts research on basic physiology and biochemistry of the sugarcane plant; on cultural practices, including methods of planting, fertilizing and irrigating; on breeding and selection of new sugarcane varieties; on the control of pests, including insects, weeds, diseases and rats; on chemistry, including methods of analysis for plant and soil constituents, for pesticide residues and for other purposes as needed; on sugarcane factory processes and process control; on sugar recovery from milling sugarcane; on raw sugar quality; and on the design and engineering of equipment, both field and factory.

In addition to its research, the Experiment Station provides some services to its member companies such as routine analyses of raw sugar and molasses, including determinations of pol, moisture, color, filterability, grain size and ash; plant and soil analyses to determine fertilizer needs; the repair and calibration of sugar factory instruments; field, factory, and factory laboratory audits; and short courses for training employees of member companies.

The Experiment Station has a large library, consisting of reference volumes and periodicals on sugarcane growing and milling, as well as on general agriculture, chemistry and engineering.

The Experiment Station maintains and operates substations on Oahu, Kauai, Maui and Hawaii. There are two principal substations on Oahu, one at Kunia for general research and one at

C and H refinery at Crockett on San Francisco Bay is one of the world's largest with daily melt capacity of 4,000 tons. C and H markets all of Hawaii's raw sugar production.

Maunawili for the maintenance of parent material and for the crossing of sugarcane varieties for the development of new varieties. Substations on Kauai, Maui and Hawaii provide areas in which seedlings from the breeding program can be grown and evaluated and where some other agricultural research can be done.

WASHINGTON REPRESENTATIVE

The Association maintains an office in Washington, D. C. where a vice president represents the member companies' interests in federal legislative actions and in the actions of federal administrative and regulatory departments.

REFINING AND MARKETING HAWAII'S CANE SUGAR

California and Hawaiian Sugar Company, San Francisco markets all the raw cane sugar and molasses produced in the state of Hawaii. It is the nation's second largest marketer of refined sugar and is the only U.S. refined cane sugar producer west of the Texas Gulf Coast.

ORGANIZATION

Best known by its brand name, "C and H", the company is an agricultural marketing association as defined by the Capper-Volstead Act, which authorizes formation of cooperative marketing associations by producers of agricultural products.

C and H stock is owned by 15-member sugar producing companies in Hawaii in substantially the same proportions as the tonnage each markets through the association.

The company also serves as refining and marketing agency for the 500-600 independent sugarcane farmers in Hawaii.

All proceeds of sugar and molasses sales, less only authorized costs of operation, are returned to member companies and sugarcane growers represented by C and H.

HISTORY

In 1906 Hawaiian producers, representing more than 80 per cent of the islands' production, acquired a refinery at Crockett, California and formed C and H to compete for sales in the U.S. refined sugar market. Their's was a successful effort to overcome price discrimination against Hawaiian raw sugar practiced by a "sugar trust" which existed among mainland sugar refiners at that time.

Originally a commercial corporation, C and H was reorganized along cooperative lines in 1921. Since 1948 it has marketed Hawaii's entire cane sugar and molasses output.

OPERATIONS

C and H accepts Hawaii's production for shipment to the mainland at island terminals. It has capacity in its two refineries to refine about 1 million tons of raw sugar annually. Raw sugar not required for C and H refining operations is sold to other refiners. Molasses is sold by C and H to distributors primarily for use in animal feed.

REFINERIES

The C and H refinery at Crockett, California near San Francisco, which began operations in 1906, has been developed until it is acknowledged as the largest in the world. It has capacity to melt some 960,000 tons of raw sugar annually.

A smaller C and H refinery at Aiea near Honolulu can process about 40,000 tons of raw sugar a year, primarily to supply Hawaii's refined sugar requirements.

Raw sugar is delivered from Hawaii to Crockett in bulk cargo ships carrying from 16,000 to 31,000 tons of raw sugar per voyage. Raw sugar is mechanically discharged into refinery storage bins which have capacity for more than 100,000 tons.

PRODUCTION

The Crockett refinery operates the year around, three shifts a day in 10-day production cycles, followed by four-day shut-downs.

Refined sugars are produced in more than 100 types, grades and package sizes. In addition to an unsurpassed variety of packaged sugars for the grocery trade, sugars are produced for industrial use in packaged, bulk granulated and liquid form. High speed packaging equipment can turn out more than a million consumer-size packages of refined sugar daily.

STORAGE AND DISTRIBUTION

The refinery warehouse has capacity for 50,000 tons of packaged refined sugar. Shipments of packaged sugar move to customers by rail, truck and river boat.

Increasing volumes of industrial sugar are delivered to food processors in bulk in granulated or liquid form. C and H operates terminals for storage and distribution of bulk granulated and liquid industrial sugars at Crockett, Aiea, Seattle, Washington; Portland, Oregon; Los Angeles, California and Phoenix, Arizona.

MARKETING

C and H brand sugar is sold in two-thirds of the mainland, generally those states west of the Mississippi River Valley extending from the Canadian to the Mexican borders, as well as Hawaii and Alaska. Sugars packaged for grocery sales under the "C and H" trademark are more widely distributed in this region than any other brand.

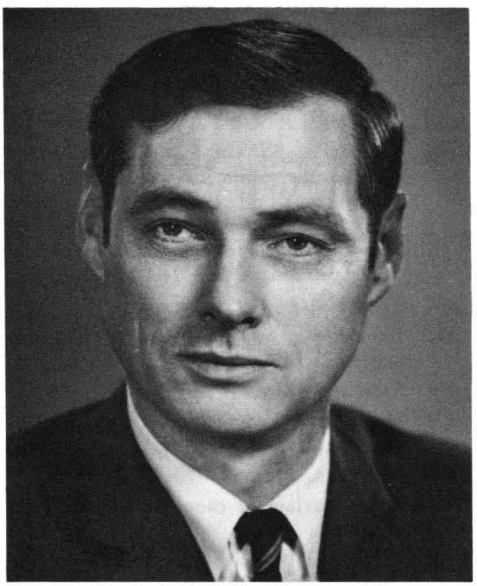
Competition for refined sales among C and H, beet sugar producers, southern and eastern cane refiners is intense in this region. A majority of the nation's 51 beet sugar factories are located in the 11 western states, which, due to freight costs, constitute the best market for C and H.

Marketing is carried out through C and H sales offices in San Francisco, Oakland and Los Angeles, California and through sugar brokers with offices in major cities throughout the balance of the territory served.

GENERAL

Over the past decade, annual C and H sales have averaged about $351 million, and have returned an average of more than $263 million annually to Hawaii's producers. The company employs approximately 1,600 persons in mainland operations and has about 70 employees at the Aiea refinery. Payroll totals approximately $27 million annually.

Robert O. Nagle is president and chief executive officer of C and H. Company headquarters are at One California Street, San Francisco, 94106.



Robert O. Nagle

IMPORTANT HISTORICAL DATES

1825 First sugarcane plantation attempted in Manoa Valley, Oahu.

1835 Ladd & Company founded first successful plantation, Koloa on Kauai.

1837 First Koloa sugar, 2.1 tons.

1838 Twenty sugar mills in operation, 18 animal powered, 2 water.

1852 Arrival of first Chinese laborers. First sugar centrifugal introduced, Makawao Plantation.

1853 First steam engine, Koloa.

1857 Irrigation introduced, Lihue.

1859 First steam mill, Lihue.

1860 Judd and Wilder established first mill on Oahu, Kualoa Plantation.

1863 Pepeekeo introduced vacuum pan.

1868 First Japanese laborers arrived.

1876 Reciprocal trade treaty, Kingdom of Hawaii and United States, admitted sugar duty free. Alexander & Baldwin built Hamakua Ditch at cost of $80,000, first large-scale irrigation on islands, 17 miles long and producing 40,000,000 gallons a day.

1878 Portuguese immigrants arrived.

1879 Ewa drilled first artesian well; Onomea pioneered with commercial fertilizer.

1881 German immigrants arrived at Lihue; Hamakua bought first steam plow.

1882 Planters' Labor & Supply Co. organized.

1895 Planters' Labor and Supply Co. disolved and members immediately organized as Hawaiian Sugar Planters' Association. HSPA Experiment Station started and first chemist hired. Makee inaugurated night grinding.

1886 First 100,000-ton crop.

1895 Experiment Station founded; Ewa installed 9-roller mill.

1897 First 250,000-ton crop.

1898 Hawaii annexed to United States.

1904 Leaf hopper parasites introduced from Australia.

1905 H-109 variety of cane germinated from seedling.

1906 California & Hawaiian Sugar Refining Corp. founded; Filipino immigration.

1907 Oahu Sugar Co. installed first 12-roller mill.

1910 Kilauea introduced gasoline tractor. Cane borer parasite introduced from New Guinea.

1916 Anomala beetle parasite introduced from the Philippines.

1920 Leaf hopper completely controlled by egg-sucking parasite introduced from Australia and Fiji.

1922 First commercial-scale mechanical loading of cane by self-propelled vehicle.

1923 First Dorr Clarifiers (2 factories).

1924 First of series of ten consecutive record crops.

1926 First Oliver Filter, Oahu Sugar Company.

1928 Establishment of sugarcane quarantine station on Island of Molokai.

1932 First million-ton crop; *bufo marinus,* insectivorous frog, brought to Territory to control pests.

1934 First high-speed sugar centrifugals—Waialua.

1935 Long-line irrigation widely adopted by plantations.

1936 First major use of trucks for cane hauling. HSPA insect and plant disease quarantine started on Midway Island.

1937 Expedition to New Guinea to collect wild sugarcanes for breeding. Mechanical harvesting begun at Ewa Plantation. Development of "prebaiting" technique of rat control. Research on food yeast from molasses. Mechanical harvesting by "grabs" started—Ewa Plantation.

1940 Kaiwiki Sugar Co. was first plantation in Hawaii to transport 100 percent of its cane to mill by trucks.

1941 32-8560 displaces H-109 as leading variety. First precision refractometer for factory control.

1942 New armyworm parasite brought from Texas. Plantation operations subordinated to defense requirements. War brings acute shortage of labor and equipment, resulting in forced use of all known types of mechanization. First bulk sugar plant began operating at Kahului, Maui.

1945 Development of activated diesel oil emulsion for weed control. Organization of the Agricultural Engineering Research Department to consolidate and expand research development. HSPA furnished $100,000 to finance University of Hawaii Agricultural Engineering Institute buildings and equipment. Ion exchange research started.

1946 Production reduced severely by two-and-a-half month strike.

1947 Plantation railroads rapidly being replaced with trucks. Field testing started on several types of cane cutters. Ion exchange pilot plant in operation.

1948 V-cutter and side-mounted cutter for unirrigated cane and 2-line cutter for

irrigated cane developed. Chemical weed control with pre-emergence and contact herbicides used on all plantations.

1949 Second bulk sugar plant began operating at Hilo, Hawaii.

1950 First commercial models of HSPA-developed harvesting machines for both irrigated and unirrigated plantations put into operation at three plantations; third bulk sugar plant began operating at Nawiliwili, Kauai; aluminum flumes used on a field scale for irrigation and cane transport.

1951 By-products pilot plant installed at Oahu Sugar Co., Ltd.; direct-mounted cane cutter and infield transport machine for unirrigated plantations developed; 37-1933 replaces 32-8560 as leading cane variety; radioactive materials used in irrigation and fertilization experiments; 40-hour week for half the year established on plantations; first bulk raw sugar shipments made to east coast. Aerial fertilization began.

1952 Cane buggy adopted by Hilo-coast plantations.

1953 First commercial application of liquid nitrogen fertilizer (aqua ammonia) made at Ewa Plantation Co.; Kauai and Maui plantations hit hardest by one of the Territory's worst droughts.

1954 First industry-wide pension plan established; HSPA corrosion inhibitor developed; 124-acre arboretum deeded to the University of Hawaii; HSPA meteorologists participate in Project Shower, "warm" rainfall study.

1955 Bulk sugar storage-loading plant completed at Honolulu.

1956 California and Hawaiian Sugar Company celebrated its fiftieth anniversary. Total half-century production came to nearly 25 million tons of raw sugar refined.

1958 Four-month-long, industry-wide strike drastically reduced production.

1959 Tenth Congress of International Society of Sugar Cane Technologists held in Honolulu.

1960 Variety 44-3098 replaced 37-1933 as leading cane variety.

1961 Production, reduced for three years by the 1958 strike, returned to normal levels.

1962 Hakalau Sugar Company was merged into Pepeekeo Sugar Company, reducing the number of sugar companies to 25. Variety 50-7209 replaced 44-3098 as leading cane variety.

1964 First sugarcane diffuser began commercial operation at Pioneer Mill.

1965 Hilo Sugar Co. and Onomea Sugar Co. merge to form Mauna Kea Sugar Co.

1966 Record raw sugar crop of 1,234,121 tons was produced.

1967 First commercial model of HSPA developed sugarcane drycleaner tested at Laupahoehoe Sugar Co.

1969 Five-week industry-wide strike over terms of new three-year contracts.

1970 First commercial sugarcane drycleaner installed at Paauhau Sugar Co. on Hawaii Island.

1971 Months-long West Coast Longshoreman's strike stops shipments to C&H, disrupts C&H marketing program, and creates raw sugar and molasses storage problems in Hawaii. Smut disease discovered on Oahu.

1972 Sub-surface and drip irrigation research intensified. Smut infection found on more than 5000 acres on Oahu. Molokai quarantine station closed. USDA agrees to undertake 2-year quarantine for Hawaii canes at Beltsville, Maryland.
Hutchinson Sugar Co. and Hawaiian Agricultural Co. merged to form Ka'u Sugar Company, reducing number of sugar companies to 18. Hilo Coast Processing Company organized as a sugar processing cooperative to mill cane produced by Mauna Kea Sugar Co. and members of United Cane Planters' Cooperative.

1973 Smut testing of 8,000 varieties completed. Top two varieties, 50-7209 and 59-3775 remain uninfected. First temporary registration for chemical ripener for sugarcane obtained. Nearly 3,000 acres of furrow-irrigated lands converted to flat culture by installing drip irrigation. Harvesting methods field trials stepped up. Success obtained with HSPA rock-removal cane drycleaner tested at Pioneer Mill Company, Ltd. First voyage of new ship, Sugar Islander, leased by California and Hawaiian Sugar Co. to take Hawaii sugar to the Mainland. Grove Farm announced it was going out of sugarcane operations. Grove Farm sugarcane lands and leases were taken over by McBryde Sugar Co. and The Lihue Plantation Co.
Paauhau Sugar Co. purchased by Honokaa Sugar Co.

1974 Variety 59-3775, developed by HSPA geneticists, became the most widely planted sugarcane within the State. Industry-wide strike closed all but Kohala Sugar Co. from March 9 through April 23. Plans were prepared for new HSPA facility in Aiea on same site as the C and H refinery. Sugar Act expired

midnight, December 31.
Hamakua Mill Co. merged into Laupahoehoe Sugar Co.

1975 HSPA offices and Experiment Station moved from Makiki to new $5 million facility in Aiea. An additional $600,000 was spent for modernizing and equipping the HSPA breeding station at Maunawili. Kohala Sugar Company was closed at the end of the 1975 grinding season. A total of 46,822 tons Hawaiian raw sugar was sold by California and Hawaiian Sugar Company to Japanese buyers.

1976 Hilo Coast Processing Co. closes Wainaku Mill as improvements to conform with EPA regulations completed at company's two other factories—Pepeekeo and Papaikou. Drought continued through 1976 and caused lower raw sugar production. Raw sugar prices in the United States reduced returns to Hawaiian producers. Companies announced reductions in force and measures to economize. On September 26, 1976 the President increased tariff on imported raw sugar from .625 cents per lb. to 1.875 cents per pound. Senate and President request investigation by United States International Trade Commission on effect of imports of raw sugar on domestic producers.

Part II

U.S. SUGAR INDUSTRY

America's sugar needs are met by a variety of sources, both domestic and foreign. Including Hawaii, 22 states produce sugar. Other states, which do not produce sugar themselves, have sugar refineries.

In 1976 the United States produced about 60% of its sugar requirements, obtaining the balance by import of raws from foreign producers. Of the approximately 7 million tons produced in the U.S., 3.9 million tons were from beets and 3.1 million tons from cane.

Sugar beets are grown in 18 states and there are beet processing factories in 16 states (see map below).

Sugarcane is grown and processed in the states of Florida, Hawaii, Louisiana and Texas and also in the Commonwealth of Puerto Rico.

Foreign raw sugar, all produced from sugarcane, is received at refineries located in principal port cities on the East Coast and the Gulf of Mexico. In 1976 raw sugar was imported from 26 foreign countries. Although there is a tariff, currently 1.875 cents per lb., on imported raw sugar, some of these producers qualified for duty-free entry of their sugar under special provisions for developing countries, under the Trade Act of 1974.

Total refined sugar deliveries in the United States in 1976 were 10,044,000 tons. Of this, approximately 6 million tons were used in industrially-produced products, such as soft drinks, bakery goods, ice cream, candy, canned foods and preserving. The remaining approximately 4 million tons were used at home and in meals served in restaurants and institutions.

BEET SUGAR INDUSTRY

Almost 40% of the sugar consumed in the U.S. in 1976 was produced from sugarbeets. Grown mostly by small farmers in 18 states, sugarbeets are sold under contract to 11 sugarbeet processing companies operating 51 factories.

The first successful sugarbeet processing plant commenced operations near San Francisco, Calif. in 1870.

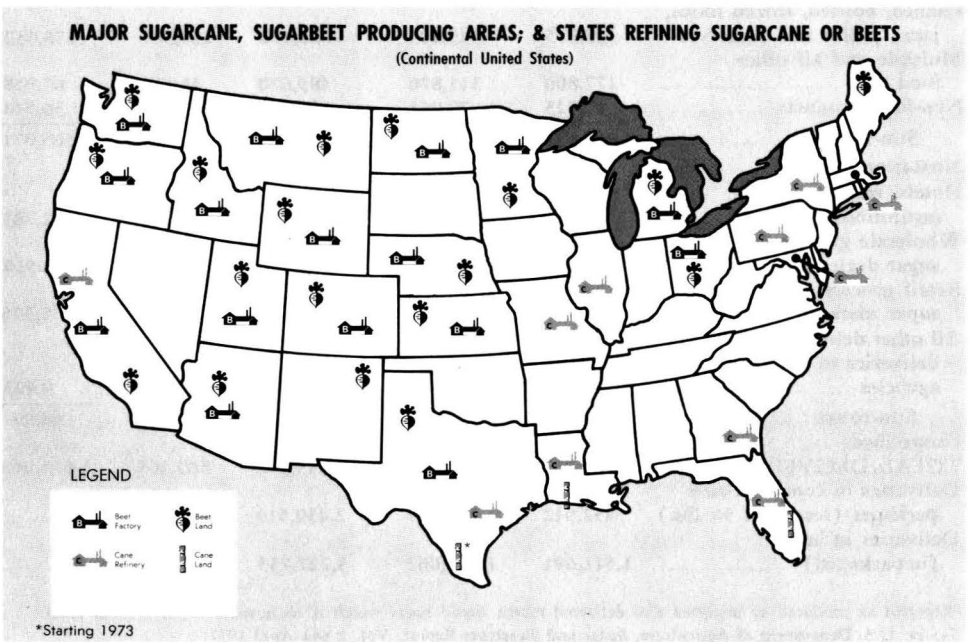
CANE SUGAR REFINING INDUSTRY

Approximately 60% of the sugar consumed in the United States is cane sugar refined in the continental United States. The nation's cane sugar refining industry consists of 22 refineries located principally on the East and Gulf Coasts with one large refinery near San Francisco.

Cane sugar refining is one of America's oldest industries, dating back to pre-Revolutionary times. Today, the industry represents a capital investment of almost $500,000,000 in buildings, machinery, docks, land and other physical properties. It provides direct employment to more than 17,500 persons and has an annual payroll in excess of $100,000,000.

Raw cane sugar supplies for the refineries are now obtained from practically all four corners

Continued on Page 23



PRIMARY DISTRIBUTION OF SUGAR CONTINENTAL UNITED STATES, BY REGION JANUARY-DECEMBER 1976

Region	Cane Sugar Refiners	Beet Sugar Processors	Mainland Cane Sugar Mills	Total	Imports of Direct-Consumption Sugar
			Short Tons[1]		
New England	364,316	7,251	0	371,567	24,874
Mid-Atlantic	1,563,673	109,320	1,521	1,674,515	26,007
North Central	1,356,082	2,154,399	12,214	3,522,695	3,777
Southern	2,784,404	172,130	1,127	2,957,662	6,041
Western	457,872	1,120,418	0	1,578,287	397
Grand Total	6,526,347	3,563,518	14,862	10,104,726	61,096

[1]Reported as produced or imported and delivered except liquid sugar which is on a sugar solids content basis.
Source: U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (3), March 1977.

SUGAR DELIVERIES, BY TYPE OF PRODUCT OR BUSINESS OF BUYER AND BY TYPE OF SUGAR, CALENDAR YEAR 1976

UNITED STATES

Product or Business of Buyer	Beet (Total)	Cane (Total)	Total All Sugar	Liquid Sugar Included in Totals	
				Beet	Cane
			Short Tons[1]		
INDUSTRIAL					
Bakery, cereal and allied products	515,107	713,436	1,228,543	8,015	84,324
Confectionery and related products	292,986	573,616	866,602	8,475	97,769
Ice cream and dairy products	211,332	306,299	517,631	81,026	210,548
Beverages	547,208	1,615,965	2,163,173	256,032	896,239
Canned, bottled, frozen foods, jams, jellies and preserves	332,975	349,203	682,178	110,387	178,632
Multiple and all other food uses	177,800	311,870	489,670	11,933	67,918
Non-food products	17,723	79,961	97,684	769	30,541
SUB-TOTAL	2,095,131	3,950,350	6,045,481	476,637	1,565,971
NON-INDUSTRIAL					
Hotels, restaurants, institutions	8,413	55,356	63,769	276	2,781
Wholesale grocers, jobbers, sugar dealers	667,949	1,366,235	2,034,184	22,084	30,510
Retail grocers, chain stores, super markets	264,237	1,005,945	1,270,182	9,369	5,375
All other deliveries, including deliveries to Government agencies	30,003	99,763	129,766	1,202	9,425
SUB-TOTAL	970,602	2,527,299	3,497,901	32,931	48,091
Unspecified	500,024	.....	500,024	.....	.....
TOTAL DELIVERIES	3,565,757	6,477,649	10,043,406	509,568	1,614,062
Deliveries in consumer-size packages (less than 50 lbs.)	452,912	1,986,607	2,439,519	.....	.....
Deliveries in bulk (unpackaged)	1,511,691	1,711,062	3,222,753	.....	.....

[1]Reported as produced or imported and delivered except liquid sugar which is on a sugar solids content basis.
Source: U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (4) April 1977.

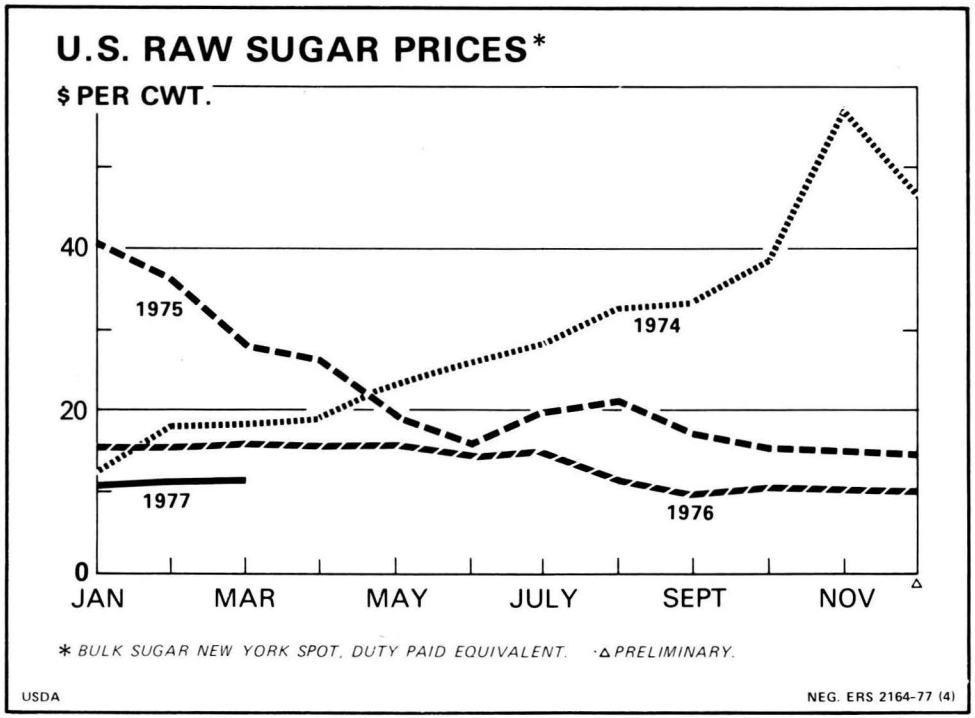


Figure S-2

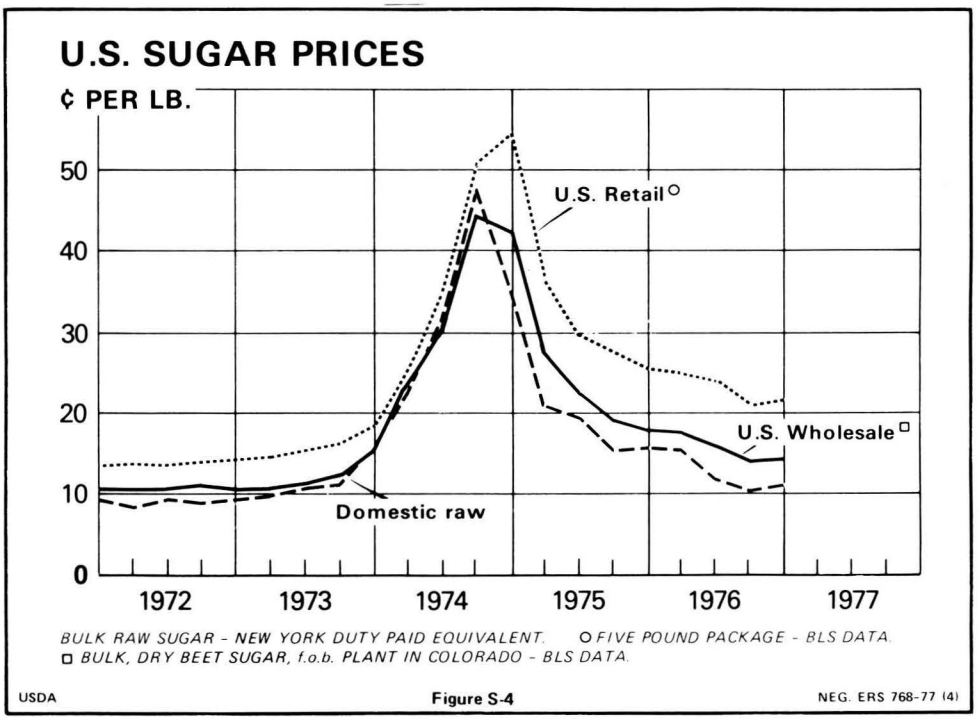


Figure S-4

Source: U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (5) May 1977.

SUGARBEETS: ACREAGE, PRODUCTION, SEASON AVERAGE PRICE PER TON RECEIVED BY FARMS AND VALUE; AND PRODUCTION OF BEET SUGAR IN THE UNITED STATES

Year	Acreage Planted 1,000 acres	Acreage Harvested 1,000 acres	Average Yield Per Acre short tons	Production 1,000 short tons	Price[1] Dollars per ton	Farm Value[1] 1,000 Dollars	Sugar produced (refined basis) 1,000 short tons
1940	971	912	13.4	12,194	5.11	62,287	1,758
1941	796	755	13.7	10,342	6.43	66,522	1,488
1942	1,048	954	12.2	11,685	6.84	79,905	1,617
1943	619	550	11.9	6,547	8.81	57,674	935
1944	633	555	12.1	6,718	10.60	71,156	979
1945	775	713	12.1	8,616	10.20	87,539	1,191
1946	905	802	13.2	10,582	11.10	117,840	1,422
1947	968	879	14.2	12,503	11.80	148,080	1,719
1948	800	694	13.6	9,424	10.60	99,639	1,280
1949	768	687	14.8	10,196	10.80	110,369	1,461
1950	1,014	925	14.6	13,535	11.20	151,293	1,878
1951	758	691	15.2	10,482	11.70	122,483	1,448
1952	719	665	15.3	10,169	12.00	121,970	1,407
1953	794	745	16.2	12,084	11.60	140,364	1,697
1954	964	876	16.1	14,082	10.80	152,151	1,909
1955	798	740	16.5	12,228	11.20	136,477	1,625
1956	831	785	16.6	12,993	11.90	155,087	1,837
1957	918	880	17.7	15,530	11.20	174,261	2,050
1958	935	891	17.0	15,150	11.70	177,807	2,056
1959	955	905	18.8	17,015	11.20	191,186	2,187
1960	977	957	17.2	16,421	11.60	190,109	2,291
1961	1,129	1,077	16.4	17,704	11.20	197,547	2,247
1962	1,182	1,103	16.5	18,254	12.80	233,243	2,417
1963	1,285	1,235	18.9	23,328	12.20	285,011	2,893
1964	1,460	1,395	16.8	23,389	11.80	275,660	3,073
1965	1,314	1,249	16.8	20,915	11.95	249,836	2,705
1966	1,240	1,161	17.5	20,342	12.80	260,355	2,643
1967	1,197	1,122	17.1	19,197	13.55	260,114	2,464
1968	1,476	1,410	18.0	25,363	13.81	350,207	3,255
1969	1,647	1,541	18.0	27,736	12.72	352,863	3,112
1970	1,483	1,419	18.6	26,427	14.84	390,813	3,179
1971	1,406	1,342	20.2	27,096	15.40	416,279	3,320
1972	1,420	1,329	21.4	28,410	16.00	455,830	3,387
1973	1,280	1,218	20.1	24,499	29.60	725,661	2,990
1974	1,252	1,213	18.2	22,123	46.80	1,035,567	2,725
1975	1,595	1,517	19.6	29,704	27.60	820,743	3,756
1976	1,526	1,479	19.9	29,366	19.70[2]	578,510[2]	3,628

[1]Includes production incentive payments which were payments made to producers of sugarbeets and sugarcane by the Commodity Credit Corporation during the period of government price control in World War II, to stimulate production, but excludes Sugar Act payments.

[2]Preliminary.

Source: 1940-1959—Agricultural Statistics, 1972, Table 114, USDA, Washington. 1960-1974—Agricultural Statistics, 1976, Table 98, USDA, Washington. 1975-1976—Crop Production, June 1977, p. B-7, SRS, USDA, Washington.

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of the globe. Domestic sugarcane production contributed over 40% of the 1976 melt, totaling 7,070,679 tons.

The 16 operating companies and the location of their refineries are as follows:

SuCrest Corporation	Brooklyn, N.Y.
	Chicago, Ill.
	Charlestown, Mass.
Amstar Corp.	Boston, Mass.
	Brooklyn, N.Y.
	Philadelphia, Pa.
	Baltimore, Md.
	Arabi, La.
Supreme Sugar Co. Inc.	Supreme, La.
California and Hawaiian Sugar Co.	Crockett, Calif.
	Aiea, Hawaii
Colonial Sugars Co.	Gramercy, La.
Everglades Sugar Refinery, Inc.	Clewiston, Fla.
Florida Sugar Refinery, Inc.	Belle Glade, Fla.
Godchaux-Henderson Sugar Co., Inc.	Reserve, La.
Imperial Sugar Co.	Sugar Land, Texas
Industrial Sugars, Inc.	St. Louis Mo.
The National Sugar Refining Co.	Philadelphia, Pa.
CPC International, Inc.	Yonkers, N.Y.
Savannah Sugar Refining Corp.	Port Wentworth, Ga.
The South Coast Corp.	Mathews, La.
Southdown, Inc.	Houma, La.

Source: F. O. Licht International Economic Sugar Year Book and Directory, 1976.

CORN SWEETENERS

Corn sweeteners, consisting of corn syrup and dextrose, have contributed substantially to total caloric sweetener use in the United States for many years. During the past 15 years, however, consumption of corn sweeteners has increased from about 13 lbs per capita to 30 lbs per capita. Consumption of other caloric sweeteners—sugar, honey and other syrups—has declined slightly during the same period.

The development of high fructose corn syrup (HFCS) has added a new corn product that is competitive with sugar for many industrial uses. This product was first introduced in 1972 and is now used to the extent of 6.8 lbs per capita. The table on the following page reports per capita use of all sweeteners in the United States for the priod 1962-76.

Based on estimates of the proportion of total corn syrup consumption that consisted of HFCS, U.S. consumption of HFCS has increased from 100,000 tons in 1972 to over 800,000 tons in 1976. There are varying estimates as to what projected consumption of HFCS will be over the next several years. This will depend on many factors but, obviously, primarily on the relative price for sugar and HFCS. Figures from the U.S. Department of Agriculture indicate that the price per hundredweight for HFCS averaged $12.00 for the first quarter of 1977. This compares with the U.S. Department of Agriculture's estimate of $15.00 per hundredweight as the list price for Chicago-West beet sugar.

The first HFCS products were approximately 42% fructose, 50% dextrose and 8% other saccharides. A second generation of products has been developed, however, with 55% fructose, and this product may be more competitive with sucrose for some industrial uses than was the 42% fructose product.

PER CAPITA CONSUMPTION OF CALORIC AND NONCALORIC SWEETENERS IN THE UNITED STATES, 1962-1976 (in pounds)

	CALORIC							NONCALORIC[2]			
	Refined Sugar	Corn Sweeteners[1]				Honey & Syrups[1]	Total	Saccharin	Cyclamate[3]	Total	TOTAL
		Dextrose	HFCS	Corn Syrup	Total						
1962	97.3	3.6	....	9.3	12.9	2.0	112.2	2.5	0.4	2.9	115.1
1963	96.7	4.3	....	9.9	14.2	1.8	112.7	3.0	0.7	3.7	116.4
1964	96.7	4.1	....	10.9	15.0	1.7	113.4	3.5	1.3	4.8	118.2
1965	96.8	4.1	....	11.0	15.1	1.8	113.7	4.0	1.7	5.7	119.4
1966	97.2	4.2	....	11.2	15.4	1.7	114.3	4.5	1.9	6.4	120.7
1967	98.3	4.2	....	11.3	15.5	1.4	115.2	4.8	2.1	6.9	122.1
1968	99.0	4.3	....	11.8	16.1	1.6	116.7	5.0	2.2	7.2	123.9
1969	100.7	4.5	....	12.3	16.8	1.6	119.1	5.3	1.6	6.9	126.0
1970	101.9	4.6	....	12.7	17.5	1.5	120.7	6.2	....	6.2	126.8
1971	102.4	5.0	....	13.0	18.0	1.4	121.8	5.7	....	5.7	127.5
1972	102.8	4.4	1.9	13.1	19.4	1.5	123.7	5.7	....	5.7	129.4
1973	101.5	4.8	2.7	14.6	22.1	1.4	125.0	5.7	....	5.7	130.7
1974	96.6	4.9	3.0	16.7	24.6	1.2	122.4	7.0	....	7.0	129.4
1975[4]	90.2	5.1	4.7	17.7	27.5	1.3	119.0	7.0	....	7.0	126.0
1976[5]	93.8	5.1	6.8	18.1	30.0	1.3	125.1	8.0	....	8.0	133.1

1Dry basis.
2Noncaloric sweeteners are in terms of sugar sweetness equivalent, which assumes saccharin is 300 times as sweet as sugar, and cyclamate is 30 times as sweet as sugar.
3Cyclamate food use was banned by the FDA effective in 1970.
4Preliminary.
5Estimate.
Source: World Bank Commodity Paper No. 25, April, 1977.

LOUISIANA—SUGAR PRODUCTION—ACREAGE—YIELD

Crop Year	Sugarcane Used for Sugar			Sugar Produced (In thousands of short tons)		Raw Sugar 96° made per ton of sugarcane (Pounds)[1]
	Acreage harvested (1000 acres)	Average yield of cane per acre (Tons)	Production (1,000 tons)	Raw Value Basis[1]	Equivalent refined[2]	
1939-40	234	21.7	5,084	436	408	172
1940-41	211	13.8	2,923	234	219	160
1941-42	224	17.6	3,947	322	301	163
1942-43	269	17.6	4,734	397	371	168
1943-44	257	20.9	5,388	432	404	160
1944-45	246	20.0	4,929	369	345	150
1945-46	234	21.9	5,128	370	346	144
1946-47	255	17.6	4,484	331	309	148
1947-48	259	15.1	3,917	297	277	152
1948-49	274	19.2	5,257	393	367	150
1949-50	279	17.9	4,984	414	387	166
1950-51	273	19.5	5,312	451	421	170
1951-52	258	17.3	4,463	295	276	132
1952-53	274	20.7	5,667	451	422	159
1953-54	280	20.6	5,759	479	448	166
1954-55	247	22.8	5,625	478	447	170
1955-56	232	24.4	5,664	454	425	161
1956-57	203	23.7	4,817	429	401	178
1957-58	226	22.0	4,976	396	370	159
1958-59	219	22.0	4,869	443	414	182
1959-60	250	20.3	5,073	440	411	174
1960-61	255	21.9	5,583	470	439	169
1961-62	277	25.7	7,118	650	607	183
1962-63	254	20.9	5,315	472	441	178
1963-64	296	28.9	8,554	759	710	177
1964-65	325	22.7	7,383	573	536	155
1965-66	288	22.7	6,542	550	514	168
1966-67	288	22.7	6,563	562	526	171
1967-68	294	27.6	8,110	740	692	182
1968-69	282	26.1	7,377	669	625	181
1969-70	235	24.1	5,676	537	502	189
1970-71	266	26.1	6,927	602	563	174
1971-72	301	21.4	6,438	571	534	177
1972-73	311	25.8	8,022	660	617	165
1973-74	319	20.6	6,570	558	522	170
1974-75	308	21.3	6,558	594	555	181
1975-76	308	21.1	6,468	644	602	199
1976-77	290	29.7	8,599	645	603	150

[1]Production reported on raw value basis.

[2]Raw value multiplied by 0.9346.

Source: 1939-40 to 1973-74—U.S. Department of Agriculture, Sugar Statistics and Related Data, Vol. 2, Statistical Bulletin No. 244.
1974-75 to 1976-77—U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (5), May 1977.

FLORIDA — SUGAR PRODUCTION — ACREAGE — YIELDS

Crop Year	Sugarcane Used for Sugar			Sugar Produced (In thousands of short tons)		Raw Sugar 96° made per ton of sugarcane (Pounds)[1]
	Acreage harvested (1000 acres)	Average yield of cane per acre (Tons)	Production (1,000 tons)	Raw Value Basis[1]	Equivalent refined[2]	
1939-40	20	35.5	714	70	65	197
1940-41	29	32.1	933	98	91	209
1941-42	31	30.7	944	94	88	198
1942-43	21	30.6	648	61	57	187
1943-44	27	25.7	699	65	60	185
1944-45	27	28.8	780	69	64	176
1945-46	31	33.2	1,041	100	93	192
1946-47	32	32.6	1,037	94	88	181
1947-48	35	26.7	921	80	75	173
1948-49	35	28.7	1,010	80	75	158
1949-50	37	30.8	1,126	105	98	186
1950-51	37	31.3	1,169	109	102	186
1951-52	39	32.4	1,260	122	114	195
1952-53	43	34.9	1,495	154	144	207
1953-54	45	32.6	1,453	151	141	207
1954-55	39	32.6	1,258	132	123	210
1955-56	35	33.4	1,160	118	110	204
1956-57	30	39.7	1,197	128	120	214
1957-58	33	41.7	1,358	135	126	201
1958-59	34	37.8	1,303	135	126	208
1959-60	46.4	38.2	1,771	175	164	198
1960-61	48.9	31.8	1,554	160	150	205
1961-62	56.2	36.2	2,036	208	194	204
1962-63	114.3	35.4	4,050	380	355	188
1963-64	142.5	31.2	4,446	424	396	191
1964-65	219.8	29.3	6,439	574	536	178
1965-66	185.4	29.1	5,505	554	518	201
1966-67	190.7	31.8	6,057	652	609	215
1967-68	190.6	34.3	6,542	717	670	219
1968-69	182.1	29.5	5,368	546	510	203
1969-70	153.4	33.8	5,197	535	500	205
1970-71	170.0	33.4	5,670	652	609	230
1971-72	189.9	31.7	6,022	635	593	211
1972-73	243.8	38.1	9,289	961	898	207
1973-74	257.6	31.5	8,119	824	770	203
1974-75	258.4	29.0	7,184	803	758	224
1975-76	287.4	35.2	10,264	1,061	992	207
1976-77	300.1	33.1	9,919	927	886	187

[1]Production reported on raw value basis.

[2]Raw value multiplied by 0.9346.

Source: 1939-40 to 1973-74—U.S. Department of Agriculture, Sugar Statistics and Related Data, Vol. 2, Statistical Bulletin No. 244.
1974-75 to 1976-77—U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (5), May 1977.

TEXAS—SUGAR PRODUCTION—ACREAGE—YIELDS

Crop Year	Sugarcane Used for Sugar			Sugar Produced (In thousands of short tons)		Raw Sugar 96° made per ton of sugarcane (Pounds)[1]
	Acreage harvested (1000 acres)	Average yield of cane per acre (Tons)	Production (1,000 tons)	Raw Value Basis[1]	Equivalent refined[2]	
1974-75	28	32.4	898	74	69	165
1975-76	35	35.3	1,236	126	118	204
1976-77	28	43.4	1,215	100	93	165

[1]Production reported on raw value basis.
[2]Raw value multiplied by 0.9346.
Source: U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (5), May 1977.

CANE SUGAR: PRODUCTION IN PUERTO RICO

Crop Year Ended	Acreage in Cane		Sugarcane Harvested		Sugar Produced, Raw Value	
	Grown	Harvested	Total	Per acre in cane harvested	Total	Per ton of cane harvested
	Acres	Acres	Tons	Tons	Tons	Pounds
1945	335,791	288,617	7,994,229	27.7	970,751	242.9
1950	382,011	367,093	10,614,632	28.9	1,298,643	244.7
1955	439,035	361,053	9,872,968	27.3	1,166,026	236.2
1960	371,644	327,961	9,996,878	30.5	1,019,033	203.9
1962	342,525	308,644	9,663,265	31.3	1,008,496	208.8
1963	337,526	303,041	10,122,518	33.4	989,235	195.5
1964	329,090	303,142	9,802,223	32.3	989,438	201.9
1965	316,263	287,644	8,806,972	30.6	896,943	203.7
1966	304,550	272,844	9,465,009	34.7	883,442	186.7
1967	280,851	263,336	8,160,195	31.0	818,294	200.6
1968	257,173	237,143	6,590,296	27.8	645,466	195.9
1969	235,166	180,069	5,901,967	32.8	483,532	163.9
1970	226,666	188,775	5,890,755	31.2	460,159	156.2
1971	N.A.	153,427	4,581,535	29.9	324,187	141.5
1972	N.A.	152,436	4,381,801	28.7	298,095	135.7
1973	N.A.	132,077	3,620,833	27.4	255,174	140.9
1974	N.A.	121,600	3,585,222	29.5	291,120	162.4
1975	N.A.	137,450	3,519,505	25.6	302,207	171.7
1976	N.A.	123,948	3,630,008	29.3	312,132	172.0

Source: Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture. *N.A.*—Not available.

EDIBLE SYRUPS: UNITED STATES PRODUCTION, FOREIGN TRADE, AND INDICATED DOMESTIC CONSUMPTION, 1950-1976

(000 GALLONS)

Year	PRODUCTION[1] SYRUPS								IMPORTS				
	Corn	Cane	Sorghum	Maple[2]	Refiners	Edible Molasses	Honey	Total	Maple Syrup	Edible Molasses and Cane Syrup[3]	Honey	Shipments from Territories Honey	Total
1950	130,448	9,745	3,539	2,006	4,005	3,314	19,780	172,837	479	2,214	1,020	30	3,743
1951	131,831	8,775	3,671	1,742	4,971	4,339	21,923	177,252	323	2,050	692	.....	3,065
1952	127,405	5,510	2,856	1,603	3,405	3,284	23,091	167,154	522	5,710	720	.....	6,952
1953	131,767	5,540	2,418	1,208	3,907	4,077	18,996	167,913	442	1,793	831	.....	3,066
1954	133,071	4,805	2,552	1,672	3,814	2,958	18,372	167,244	371	2,015	777	.....	3,163
1955	138,226	4,730	2,405	1,578	3,853	2,820	21,666	175,278	457	2,305	837	.....	3,599
1956	141,504	4,990	3,594	1,529	3,882	3,193	18,169	176,861	643	2,046	406	.....	3,095
1957	142,089	3,965	2,516	1,697	3,620	2,384	20,447	176,748	757	573	404	.....	1,734
1958	153,481	3,135	2,282	1,392	4,892	2,553	22,116	189,851	656	1,286	335	.....	2,277
1959	162,197	3,617	2,286	1,137	3,999	3,084	20,083	196,403	691	2,138	383	.....	3,212
1960	169,776	3,676	1,943	1,143	4,134	2,714	20,611	203,997	908	1,884	1,049	.....	3,841
1961	180,397	3,519	.....	1,524	3,846	3,379	21,721	214,386	904	911	768	.....	2,583
1962	201,259	3,303	.....	1,460	2,691	3,075	21,189	232,977	929	3,827	604	.....	5,360
1963	215,573	2,702	.....	1,143	2,769	2,772	22,647	247,606	1,068	1,706	221	.....	2,995
1964	238,832	2,814	.....	1,546	2,862	2,685	21,323	270,062	666	2,119	417	.....	3,202
1965	243,682	2,989	.....	1,266	2,994	2,648	20,427	274,006	879	3,349	1,127	.....	5,355
1966	252,337	2,923	.....	1,476	2,493	2,563	20,403	282,195	938	3,061	806	.....	4,805
1967	255,860	2,121	.....	979	2,402	2,477	18,225	282,064	1,147	1,065	1,416	.....	3,628
1968	274,000[4]	2,346	.....	983	2,561	2,466	16,165	298,521	988	3,732	1,427	.....	6,147
1969	282,000[4]	2,661	.....	1,032	2,235	2,532	22,591	313,051	1,185	2,266	1,244	.....	4,695
1970	292,000[4]	.....	.....	1,110	1,695	2,121	18,736	315,662	956	2,165	749	.....	3,870
1971	304,000[4]	.....	.....	962	1,883	2,517	16,674	326,036	577	2,470	967	.....	4,014
1972	352,000[4]	.....	.....	1,099	2,077	2,290	18,081	375,547	710	1,694	3,291	.....	5,695
1973	410,000[4]	.....	.....	857	2,309	1,926	20,072	435,164	803	2,935	900	.....	4,638
1974	470,000	.....	.....	1,087	2,564	1,559	15,632	490,842	801	2,508	2,196	.....	5,509
1975	520,000	.....	.....	1,201	2,482	1,560	16,717	541,960	609	2,483	3,917	.....	7,009
1976[5]	570,000	.....	.....	927	2,403	1,550	16,877	591,757	888	3,188	5,616	.....	9,692

Year	EXPORTS				INDICATED DOMESTIC CONSUMPTION SYRUPS					
	Corn Syrup	Edible Molasses and Syrup including Maple[6]	Honey	Total	Corn	Maple	Sorghum	Cane Syrup, Refiners Syrup, and Edible Molasses	Honey	Total
1950	3,761	242	801	4,804	126,687	2,485	3,539	19,036	20,029	171,776
1951	4,287	231	1,075	5,593	127,544	2,065	3,671	19,904	21,540	174,724
1952	3,101	153	1,968	5,222	124,304	2,125	2,856	17,756	21,843	168,884
1953	3,241	267	2,789	6,297	128,526	1,650	2,418	15,050	17,038	164,682
1954	3,233	272	2,061	5,566	129,838	2,043	2,552	13,320	17,088	164,841
1955	3,386	248	1,739	5,373	134,840	2,035	2,405	13,460	20,764	173,504
1956	3,189	249	1,548	4,986	138,315	2,172	3,594	13,862	17,027	174,970
1957	2,745	250	1,681	4,676	139,344	2,454	2,516	10,292	19,200	173,806
1958	2,396	165	1,902	4,463	151,085	2,048	2,282	11,701	20,549	187,665
1959	2,245	155	1,062	3,462	159,952	1,828	2,286	12,683	19,404	196,153
1960	1,836	182	797	2,815	167,940	2,051	1,943	12,226	20,863	205,023
1961	1,370	173	607	2,150	179,027	2,428	.....	11,482	21,882	214,819
1962	1,514	140	1,158	2,812	199,745	2,389	.....	12,756	20,635	235,525
1963	2,055	192	2,125	4,372	213,518	2,211	.....	9,757	20,743	246,229
1964	1,632	205	760	2,597	237,200	2,212	.....	10,275	20,980	270,667
1965	1,003	.....	1,166	2,169	242,679	2,145	.....	11,980	20,388	277,192
1966	1,038	.....	1,219	2,257	251,299	2,414	.....	11,040	19,990	284,743
1967	1,113	.....	986	2,099	254,747	2,126	.....	8,065	18,655	283,593
1968	1,541	.....	684	2,225	272,459	1,971	.....	11,105	16,908	302,443
1969	2,169	.....	833	3,002	279,831	2,217	.....	9,694	23,002	314,744
1970	1,324	.....	688	2,012	290,676	2,066	.....	5,981	18,797	317,520
1971	1,324	.....	640	1,964	302,676	1,539	.....	6,870	17,001	328,086
1972	1,205	.....	346	1,551	350,795	1,809	.....	6,061	21,026	379,691
1973	1,377	.....	1,484	2,861	408,623	1,660	.....	7,170	19,488	436,941
1974	1,742	.....	386	2,128	468,258	1,888	.....	6,631	17,442	494,219
1975	1,074	.....	337	1,411	518,926	1,810	.....	6,525	20,297	547,558
1976[5]	1,680	.....	396	2,076	568,320	1,815	.....	7,141	22,097	599,373

[1]Production of cane syrup, sorghum syrup, and edible molasses is of the fall of the preceding year. Estimates of sorghum discontinued beginning 1961; cane syrup discontinued beginning 1969. [2]Does not include varying quantities produced on nonfarm lands in Somerset County, Maine. [3]U.S. Department of Commerce molasses and sugar syrups series, less liquid sugar imports reported to Sugar Division, Agricultural Stabilization and Conservation Service. [4]Unofficial estimates. [5]Preliminary. [6]Assumed to be largely refiners' syrup. Beginning 1965, data not available because of change in export classification.

Source: U.S. Department of Agriculture, Economic Research Service. Data for 1949-58 in *Agricultural Statistics,* 1972, table 139. Data for 1959-76 in *Agricultural Statistics,* 1976, p. 94.

Part III

U.S. SUGAR LAWS

Laws governing sugar in the United States are as old as the country itself. Following is a brief review.

SUGAR'S TAXATION HISTORY

Sugar is one of the world's most regulated commodities. Approximately 85 percent of total world production comes under some type of internal or external law or regulation.

Sugar in the United States has been under government regulation since the American Revolution.

The first piece of general legislation enacted by the first U.S. Congress in 1789 was the first sugar tariff of the United States.

It provided for a duty of one cent per pound on brown sugars; three cents on loaf; and, one and one-half cents on all other types of sugars.

From that time on, sugar tariffs provided a major source of revenue until the imposition of Federal income and corporate taxes.

Accordingly, the rates had a tendency to fluctuate somewhat depending upon the condition of the national treasury.

Because the purity of present-day refined sugars was unknown in the early days of the republic, complex tables of rates were required to assess the widely varying qualities of sugar which came into the U.S. from many parts of the world.

The Tariff Act of 1816 taxed loaf sugar at 12 cents per pound. There were other high tariffs during the Civil War period, after which tariff rates generally declined.

The Reciprocity Treaty of 1875 between the Kingdom of Hawaii and the United States provided for free entry of Hawaiian Sugar. Annexation in 1898 made Hawaii a domestic producer.

For four years beginning in 1890, sugar was placed on the free lists, and a bounty to encourage production was paid to domestic producers. Louisiana growers benefited most from this as the beet sugar industry was just getting underway and Hawaii was not yet a part of the United States.

The Spanish American War, beginning in 1898, had a major influence on American sugar supplies.

Puerto Rico in 1900 was given a preferential reduction in tariff charges. A year later, her sugar was placed on the free list.

The Philippines in 1902 received a 25 percent preferential tariff reduction. In 1909, she was permitted free entry on the first 300,000 tons of sugar exported to the U.S. In 1914, all of her sugar sales to the U.S. were placed on the free list.

Cuba in 1903 received a preferential tariff reduction of 20 percent below the full world tariff rate. Up to the early 1960's, Cuba retained a preferred tariff position among foreign suppliers of the American market. Cuba was considered America's sugar warehouse.

Diplomatic relations between Cuba and the U.S. were severed in 1961 and its quota was allocated to other suppliers on a formula basis established by Congress.

The Philippines, granted independence by the United States in 1946, stayed on the free list until December 31, 1955.

U.S. DUTIES ON FOREIGN SUGAR

Excluding those areas which have received preferential treatment, the tariff duty paid by other suppliers of the U.S. market has been changed eight times over the years since 1897 when it was set at 1.685 cents per pound. It dipped slightly in the 1914-21 period and then climbed to 2.5 cents a pound during the 1930-34 period and subsequently declined to 0.625 cents beginning in 1951.

In response to the pleas of representatives of sugar-producing states throughout the U.S., President Gerald R. Ford increased the import tariff to 1.875 cents a pound on Sept. 21, 1976.

MODERN U.S. SUGAR LEGISLATION

The Depression of 1929 drove home the point that tariffs alone could not be the sole tool to regulate U.S. sugar supplies. In 1934, the Jones-Costigan Act amended the Agricultural Adjustment Act to include sugar as a basic commodity under the general farm program.

It provided for a processing tax on refined sugar, for benefit payments to sugarbeet and sugarcane growers under production adjustment contracts, and for quotas for domestic and foreign areas supplying the U.S. market.

The Supreme Court in 1936 declared the benefit payments and taxes on sugar unconstitutional, but quotas were not questioned and continued in effect.

The Sugar Act of 1937, which embodied the basic principles of the Jones-Costigan Act, was signed into law September 1 of that year and continued in effect until succeeded by the current law, the Sugar Act of 1948. However, the quota system was suspended for several years during the 1940's because of World War II.

The Sugar Act of 1948 has been extended seven times with various amendments. The seventh extension was signed by President Richard M. Nixon in October 1971. The Act was extended for three years until December 31, 1974.

U.S. SUGAR ACT

The United States Sugar Act, generally called the Sugar Act of 1948, as amended, was a fed-

CONTINENTAL U.S. SUGAR CONSUMPTION* AND POPULATION

Five Year Intervals—1873-1928

Year	Total Sugar Consumption* (Short tons, raw value)	Population** (000's)	Per Capita Consumption (Pounds, refined value)
1873....	897,072	41,677	40.23
1878....	926,929	47,598	36.40
1883....	1,402,577	53,693	48.83
1888....	1,746,385	59,974	54.43
1893....	2,283,985	66,970	63.75
1898....	2,400,278	73,494	61.05
1903....	3,055,492	80,983	70.52
1908....	3,817,849	89,073	80.11
1913....	4,485,778	96,512	86.88
1918....	4,189,134	103,588	75.59
1923....	5,729,172	111,537	96.01
1928....	6,658,400	119,862	103.83

Yearly Intervals—1931-1976

1931....	6,702,080	124,039	100.99
1932....	6,438,880	124,840	96.40
1933....	6,387,041	125,579	95.07
1934....	6,331,585	126,374	93.64
1935....	6,633,928	127,250	97.44
1936....	6,706,195	128,053	97.89
1937....	6,671,402	128,825	96.79
1938....	6,643,253	129,825	95.64
1939....	6,867,518	130,880	98.08
1940....	6,890,668	132,122	97.49
1941(a)	8,069,457	133,402	113.06(a)
1942....	5,466,204	134,860	75.76
1943....	6,334,713	136,739	86.59
1944....	7,147,350	138,397	96.53
1945....	6,040,569	139,928	80.69
1946....	5,620,708	141,389	74.31
1947....	7,447,834	144,126	96.59
1948....	7,342,971	146,631	93.61
1949....	7,580,225	149,188	94.97
1950....	8,279,330	151,683	102.02
1951....	7,736,573	154,360	93.68
1952....	8,104,160	157,028	96.47
1953....	8,484,900	159,636	99.35
1954....	8,206,606	162,417	94.44
1955....	8,399,081	165,270	94.99
1956....	8,903,877	168,176	98.96
1957....	8,733,988	171,198	95.36
1958....	9,030,271	174,060	96.97
1959....	9,181,146	177,261	96.81
1960....	9,260,833	180,085	96.12
1961....	9,610,929	183,093	98.11
1962....	9,751,927	185,933	98.04
1963....	9,988,831	188,619	98.99
1964....	9,670,693	191,262	94.51
1965....	10,020,287	193,653	96.72
1966....	10,299,344	195,904	98.27
1967....	10,245,342	198,045	96.70
1968....	10,927,340	200,029	102.11
1969....	10,654,760	201,975	98.61
1970....	11,309,516	204,158	103.54
1971....	11,288,057	206,313	102.27
1972....	11,415,469	208,082	102.54
1973....	11,482,298	209,627	102.38
1974....	11,237,140	211,097	99.50
1975....	9,974,144	212,730	87.64
1976†	10,859,365	214,287	94.72

* Theoretical consumption. (Actually deliveries for consumption, and includes deliveries for U.S. military forces at home and abroad.)

** Includes Alaska, excludes Hawaii.

Source: Lamborn Sugar Market Report, June 28, 1977.

(a) During 1941, a large quantity of the deliveries went into the building up of the "invisible" supply, and was not consumed during that year. In 1942, the major portion of this invisible supply was recaptured by the OPA and reallotted for consumption during 1942.

† Preliminary.

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eral law designed to achieve three major goals:

1. To assure consumers of adequate supplies of sugar at reasonable prices.
2. To maintain the domestic sugar industry.
3. To promote the export trade of the United States.

It was also designed to be self-supporting.

To a remarkable degree it achieved those goals.

After 1934 when the law went into force, abundant supplies of sugar were available to American consumers at fair and reasonable prices. A vigorous sugar industry was developed within our national borders.

There were social gains too, in the improvement of wages and working conditions of farm laborers.

The program also put more than $660 million into the U.S. Treasury above its costs.

HOW THE SUGAR ACT WORKED

The Act directed the Secretary of Agriculture in October of each year to estimate the consumption of sugar in the U.S. for the year ahead.

Once he had arrived at an estimate, the total amount of sugar it represented was allocated among domestic and foreign sources of supply by a formula set down in the Act. These allocations were quotas—the amount of sugar each area was permitted to market in the United States in the ensuing year.

Roughly 40 percent of the total was assigned to 34 foreign countries, 21 of them in the Western Hemisphere.

If, as the year advanced, it appeared that the Secretary of Agriculture's estimate of consumption was too high or too low, he was required to revise the estimate to meet the changed conditions. In the event that any area —domestic or foreign—was unable to fill its quota, the Secretary reallocated the deficit to fill the void and thus maintain an even flow of sugar to consumers.

Deficits in domestic areas and foreign countries were reallocated to foreign countries.

END OF THE SUGAR ACT

The U.S. House of Representatives on June 5, 1974, by a vote of 209 to 175, rejected a bill which would have extended the 40-year-old U.S. Sugar Act through 1979.

The end of the Sugar Act on December 31, 1974 placed domestic U.S. sugar producers in direct competition with producers in the "World Sugar Market." The U.S. is the only major sugar-producing and also sugar-importing country that has no effective government regulation of the production and importation of sugar.

PROPOSED SUGAR PROGRAM

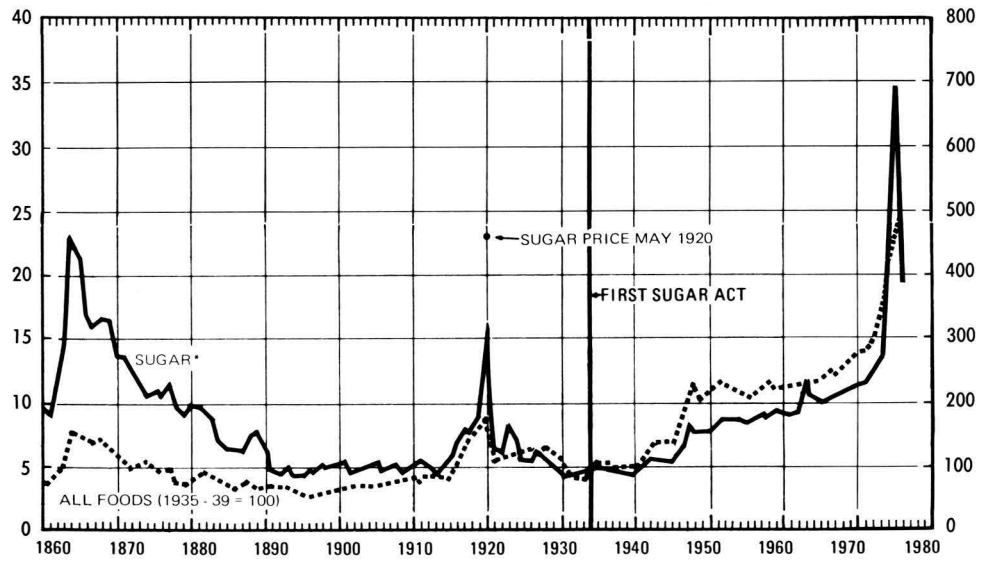
On May 4, 1977 President Carter announced an Administrative sugar program under which United States producers would receive support payments. The program proposed that domestic producers would be paid a maximum of 2 cents per pound of sugar produced when the average price was 11.5 cents per pound or less. This would bring total returns from the market and the support payments to a maximum of 13.5 cents per pound. Later, the program was modified to provide support at 13.5 cents regardless of market price.

Regulations for the administration of the program were published and comments invited. At this date, they have not been put into effect.

At the time President Carter announced his sugar program for the United States, he said he considered it to be "an interim program" because he was confident that an International Sugar Agreement would result from the negotiations then going on in Geneva. He thus indicated that any long-range U.S. domestic sugar policy would be based, in part at least, on participation in an International Sugar Agreement. (See page 34 for discussion of International Sugar Agreement.)

In July 1977, amendments to the general Agriculture Act of 1977 were adopted in the House of Representatives which would include sugar as a commodity eligible for price support under loan and purchase programs. The Senate version of the legislation did not include such provisions, but a House-Senate conference committee has agreed on amendments that would provide support to U.S. producers of sugarcane and sugar beets. The Congress still has to approve the bill and the President must sign it before it becomes law.

Refined Sugar Prices, and Index of All Food Prices At Wholesale, 1860-1976



Source: All foods prices—U.S. Dept. of Labor.
All sugar prices—U.S. Dept. of Agriculture.

TOTAL FOREIGN IMPORTS INTO U.S.A. (Mainland) BY COUNTRIES OF ORIGIN: 1973 THROUGH 1976

Source of Supply	1973	1974	1975	1976
		(Short Tons, Raw Value)		
OFFSHORE				
FOREIGN				
Argentina	84,758	109,755	112,318	86,729
Australia	265,385	241,705	479,172	469,528
Austria	.....	10	.....	16
Belgium	.....	2	.....	1,129
Belize	.....	62,506	46,155	14,349
Boliva	7,549	5,714	3,507	52,990
Brazil	652,078	783,330	197,131	.....
Canada	47,508	1	39,990	50,568
China, Republic of	86,198	90,059	139,963	86,533
Colombia	75,055	104,820	159,065	84,454
Costa Rica	99,704	78,515	56,240	65,075
Denmark	.....	.....	2	.....
Dominican Republic	844,243	817,728	775,147	971,309
Ecuador	93,155	59,628	46,770	28,440
El Salvador	59,879	65,127	107,466	143,154
Fiji Islands	44,605	46,083	1	.....
France	.....	.....	.....	13,340
Germany, West	.....	5	1	990
Guatemala	62,551	95,934	60,606	330,756
Haiti	15,294	18,807	11,622	6,218
Honduras	.....	8,455	6,073	7,483
India	81,445	84,902	187,624	188,506
Korea	.....	.....	10,615	777
Malagasy Republic	12,130	13,088	13,022	13,400
Malawi	15,615	10,274	26,585	17,659
Mauritius	44,599	45,527	26,741	29,811
Mexico	636,825	538,131	41,130	551
Mozambique	.....	.....	15,090	31,847
Netherlands	.....	.....	22	1,501
Netherlands Antilles	.....	.....	1,296	.....
Nicaragua	76,192	53,254	57,962	165,633
Panama	52,272	65,525	98,250	95,031
Paraguay	7,398	8,506	3,328	10,187
Peru	407,406	471,145	215,679	312,772
Philippines	1,454,362	1,472,299	413,034	915,124
South Africa	73,883	69,410	134,082	98,472
Swaziland	30,185	41,360	35,795	45,805
Sweden	9	4	3	2
Switzerland	.....	.....	.....	745
Thailand	19,072	26,220	123,512	70,059
United Kingdom	.....	.....	29	82
Uruguay	.....	.....	.....	5,229
Venezuela	31,901	.....	24	.....
West Indies	40,836	282,146	237,537	243,978
Total Foreign	5,422,092	5,769,975	3,882,589	4,660,232

Source: U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (3), March 1977.

Part IV

WORLD PRODUCTION

Sugar, a basic food, is produced by some 125 nations throughout the world. The Foreign Agricultural Service of the U.S. Department of Agriculture reported that total sugar production in the 1976-77 crop year was 94.4 million short tons. Of this, 36.0 million tons of sugar were produced from sugar beets and 58.4 million tons of sugar were from sugarcane. An additional 1 million short tons of noncentrifugal sugar were produced, mostly for consumption in areas near where the sugar was produced.

WORLD PRICE

In one form or another, the people of the world consume about 90 million tons of sugar each year. Most of it is consumed in the areas where it is grown. Some additional sugar is reserved for markets where the growers have government assistance or some form of preferential treatment.

The remaining world production—the fraction that has no "home"—constitutes the so-called "world market" or "free market."

Prices in the world market are normally depressed, frequently below the cost of production in even the most efficient producing areas.

The world price bears not the faintest relationship to costs of production, or to decent living standards. It is simply a dumping price and is so recognized universally.

INTERNATIONAL SUGAR AGREEMENT

The International Sugar Agreement, 1973, which succeeded the International Sugar Agreement, 1968, came provisionally into force on January 1, 1974 and definitively into force on October 15, 1974. The present Agreement contains no economic clauses and its main purpose is to keep in being the International Sugar Organization to prepare the bases and framework of a new, fully effective International Sugar Agreement. In discharging this responsibility, the Council of the Organization was authorized to arrange for studies to be made and discussions to be held between Members of the Agreement and with non-Members, as well as with other Organizations. The Council has also been empowered to request the Secretary-General of UNCTAD to convene a negotiating conference as soon as it considers it appropriate. The Council, at its first session in January 1974, established a Consultative Committee consisting of all Members of the Organization. This Committee held two meetings in 1974 and continued its work in 1975. The Committee established a Sub-Committee to assist it in its task which, in turn, set up two special Working Groups to undertake a technical examination of the matter of stocks for the operation of a future Agreement and of problems connected with price references in a future Agreement.

The Working Groups examined various issues to be dealt with and reported to the Consultative Committee in May 1975. The work of these Groups is being continued and that of one of the Groups has been extended to cover all aspects of supply management. This was going to require more time and, bearing in mind that the Agreement was due to expire on 31 December 1975, the Council was invited to extend the Agreement for a further year. This was done and the Agreement was extended to 31 December 1976.

At the end of December 1975 there was a total of 36 exporting and 19 importing countries which were parties to the 1973 International Sugar Agreement. The United States, which participated in the 1973 U.N. Sugar Conference at Geneva but is not a party to the present Agreement, accepted an invitation to observe at sessions of the International Sugar Council, as it had done under the previous Agreement, and at discussions by the Consultative Committee of the bases and framework of a future Agreement. At a later stage the United States was invited to participate fully in the discussions of some of the Groups of that Committee.

The International Sugar Organization met in London in June and September 1976 for discussions of possible provisions of an International Sugar Agreement. Based on these discussions a preparatory committee met in early 1977 to draft an agreement that formed the basis for negotiations at a United Nations conference held in Geneva in April-May 1977. Agreement was not achieved in these negotiations. Subsequently, however, further discussions by representatives of selected countries in London concluded there would be sufficient hope of success to justify another negotiating meeting in September 1977. Lower world prices for sugar during the summer of 1977 stimulated renewed interest in a possible International Sugar Agreement.

NEW YORK COFFEE AND SUGAR EXCHANGE, INC.

The world's largest market for trading in raw sugar is New York. Here are located the principal buyers and sellers, or their agents, of raw sugar for the U.S. domestic market. In addition, a very large proportion of the sugars sold to world market buyers of sugar is also channeled through New York.

Of extreme importance in this market is the New York Coffee & Sugar Exchange, Inc., whereon sugars for both the U.S. and world markets are bought and sold for future delivery. The Exchange is located in the World

Trade Center Bldg., New York, N.Y. The Sugar Exchange, like all organized commodity markets, provides the opportunity for various vital economic functions to be performed.

The Exchange provides a market in which the sugar producer may hedge (sell) all or part of his anticipated production and thus guarantee his price. Amongst other advantages, this facilitates financing. Conversely, the sugar buyer can determine a price far in advance by buying on the Exchange. This enables the buyer to anticipate his requirements and establish his cost.

Each day during trading hours, there is a ready market for buying and selling. This is not the case in actuals.

The Exchange is a public market with all quotations and trades a matter of open record. This permits all who are interested in sugar to know its value from day to day and, if necessary, minute to minute. Through the Exchange function, there is recorded the meeting of minds of buyers and sellers as to values as represented by trades or bid and asked prices.

The Exchange serves as a guidepost for the future by providing a means of trading for delivery in position as much as a year and a half ahead. The quotations, representing, as they do, the thinking of the keenest students of the sugar market, foreshadow coming events.

The Exchange disseminates information pertaining to sugar received from all corners of the earth.

To the Exchange trading floor come buying and selling orders which may emanate from all parts of the sugar world—from producers, refiners, merchants, sugar consumers. The public is also represented through the speculative activity which is a necessity for the creation of a broad, stable, realistic commodity market.

In the trading area, specialists known as "floor brokers" execute the buying and selling orders of their clients. All trading is done by open outcry and there are adequate safeguards to assure equitable treatment for all traders, be they large or small.

At the conclusion of each day's trading, all purchases and sales are submitted by the broker members of the New York Coffee & Sugar Clearing Association to that Association. The Clearing Association intervenes as a principal in each transaction. It becomes the buyer on each sale made and the seller on each purchase made—thus protecting the integrity of all contracts made on the Exchange.

The brokers deposit margins with the Clearing Association as a guarantee that the contracts will be fulfilled. These margins are, moreover, maintained adequately each day as the market fluctuates.

An additional protection is afforded through the Guarantee Fund of the Clearing House which is created by a deposit made by each firm at the time it joins the Clearing Association. The Guarantee Fund is available to make good any default by a member firm.

SUGAR FUTURES CONTRACTS

DOMESTIC NO. 12 CONTRACT

The Domestic No. 12 raw sugar futures contract was initiated on October 1, 1974. The terms of the contract are similar to those of existing commercial contracts for actual raw sugar between sellers and refiners. Delivery must be made at a sugar refinery selected by the receiver or buyer at delivery points in New York, Philadelphia, Baltimore or New Orleans.

Trading is permitted for delivery during an 18 month period. However, the trading months will be January, March, May, July, September, and November. The contract is for 50 long tons (112,000 lbs) of raw centrifugal cane sugar based on 96 degrees average polarization outturn.

Price quotations are on a pound price basis with minimum fluctuations of 1/100 or .01 cents per pound. Trading limits are 1¢ per pound above or below the previous day's settlement price with a maximum range of 2¢ per pound.

The No. 12 Contract replaces the No. 10 Contract which was phased out in July 1975.

WORLD NO. 11 CONTRACT

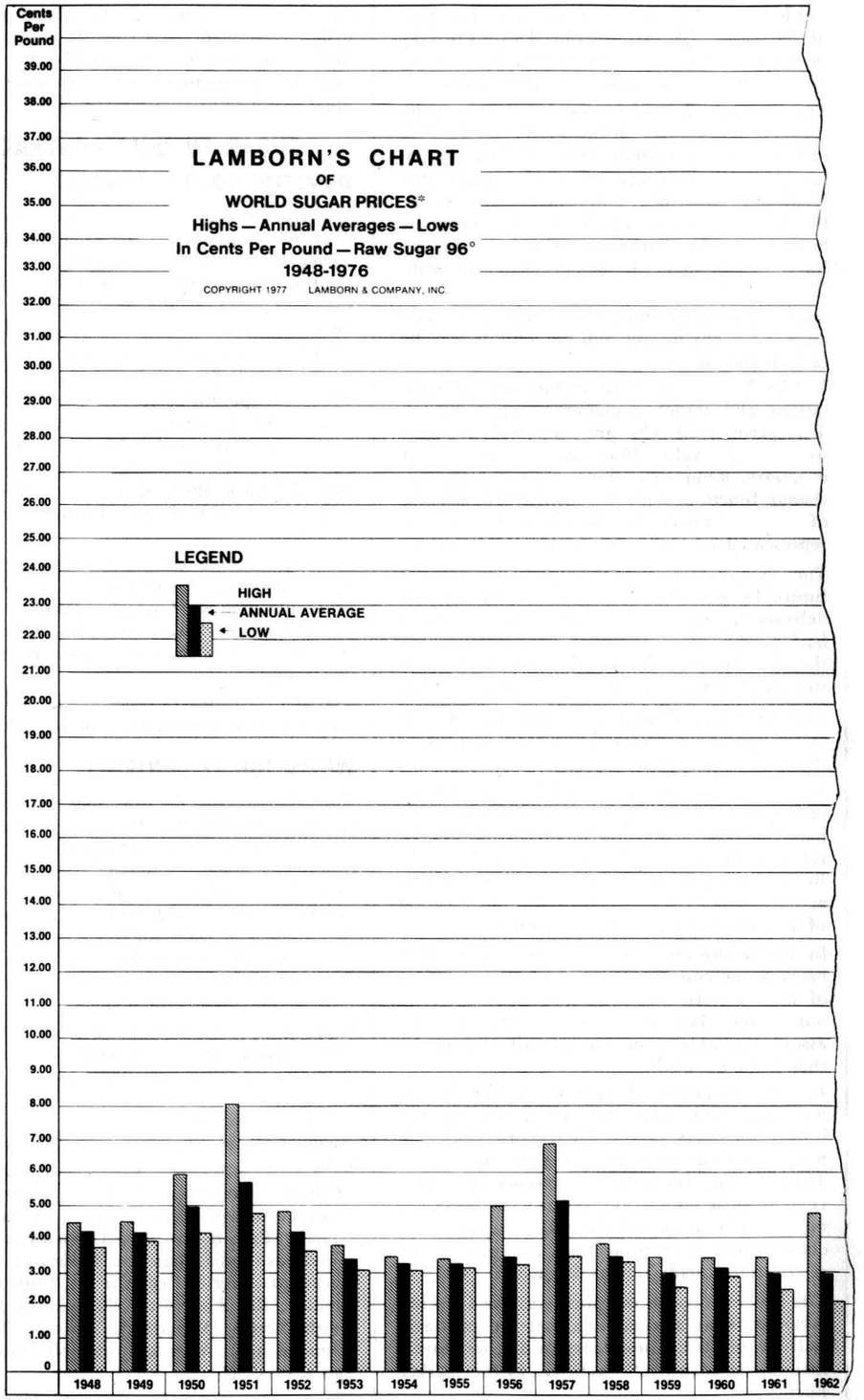
The World No. 11 raw sugar contract was initiated on May 5, 1970. It is truly international in scope and services the major non-communist sugar producing nations. Delivery points were amended in 1974 to include destinations in the United States as well as a port in almost any cane sugar producing country. However, shipment to the United States is under the proviso that it is not contrary to the laws of the country of origin.

Under the terms of the contract, both deliverer and receiver have considerable latitude. The deliverer or seller may select a port in one of a number of delivery points. The receiver or buyer charters the ocean-going vessel and determines the final destination of the raw sugar.

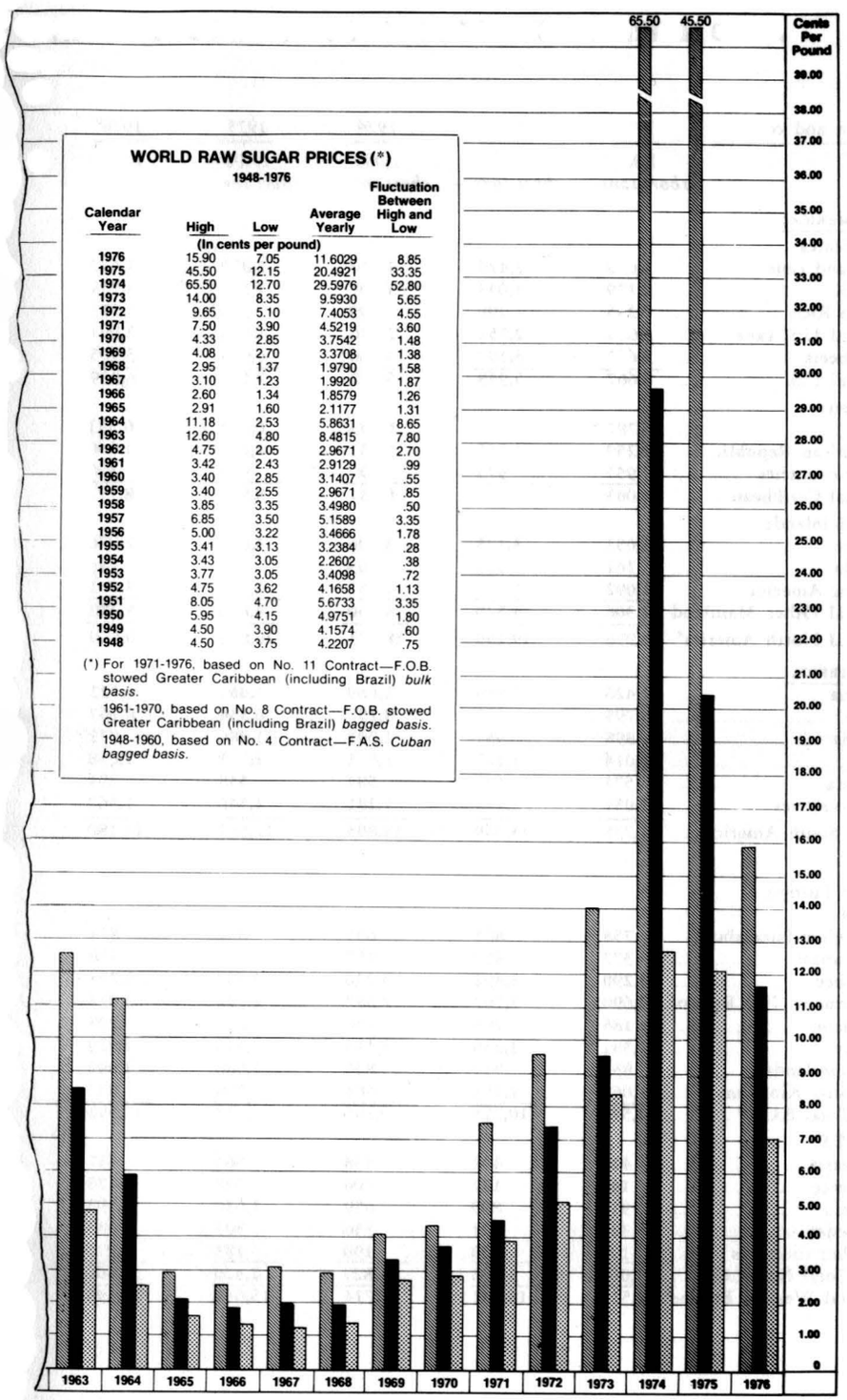
Sugars of Argentina, Australia, Brazil, Belize (British Honduras), Colombia, Costa Rica, Dominican Republic, El Salvador, Ecuador, Fiji Islands, French Antilles, Guatemala, Haiti, Honduras, India, Jamaica, Mauritius, Mexico, Nicaragua, Peru, Republic of Congo (Brazzaville), Republic of the Philippines, Reunion, South Africa, Swaziland, Taiwan, Thailand, Trinidad and Venezuela are deliverable f.o.b. and stowed in bulk.

The trading months are January, March, May, July, September and October.

Continued on page 40



★ ★ ★ ★ LAMBORN'S COMPLETE SUGAR



WORLD RAW SUGAR PRICES (*)
1948-1976

Calendar Year	High	Low	Average Yearly	Fluctuation Between High and Low
	(In cents per pound)			
1976	15.90	7.05	11.6029	8.85
1975	45.50	12.15	20.4921	33.35
1974	65.50	12.70	29.5976	52.80
1973	14.00	8.35	9.5930	5.65
1972	9.65	5.10	7.4053	4.55
1971	7.50	3.90	4.5219	3.60
1970	4.33	2.85	3.7542	1.48
1969	4.08	2.70	3.3708	1.38
1968	2.95	1.37	1.9790	1.58
1967	3.10	1.23	1.9920	1.87
1966	2.60	1.34	1.8579	1.26
1965	2.91	1.60	2.1177	1.31
1964	11.18	2.53	5.8631	8.65
1963	12.60	4.80	8.4815	7.80
1962	4.75	2.05	2.9671	2.70
1961	3.42	2.43	2.9129	.99
1960	3.40	2.85	3.1407	.55
1959	3.40	2.55	2.9671	.85
1958	3.85	3.35	3.4980	.50
1957	6.85	3.50	5.1589	3.35
1956	5.00	3.22	3.4666	1.78
1955	3.41	3.13	3.2384	.28
1954	3.43	3.05	2.2602	.38
1953	3.77	3.05	3.4098	.72
1952	4.75	3.62	4.1658	1.13
1951	8.05	4.70	5.6733	3.35
1950	5.95	4.15	4.9751	1.80
1949	4.50	3.90	4.1574	.60
1948	4.50	3.75	4.2207	.75

(*) For 1971-1976, based on No. 11 Contract—F.O.B. stowed Greater Caribbean (including Brazil) *bulk basis.*

1961-1970, based on No. 8 Contract—F.O.B. stowed Greater Caribbean (including Brazil) *bagged basis.*

1948-1960, based on No. 4 Contract—F.A.S. *Cuban bagged basis.*

BROKERAGE SERVICE ★ ★ ★ ★

WORLD CENTRIFUGAL SUGAR PRODUCTION IN SPECIFIED COUNTRIES, RAW VALUE, 1972/73 TO 1976/77[1]

Region and country	1972	1973	1974	1975	1976[2]
	1,000 short tons—	*1,000 short tons—*	*1,000 short tons—*	*1,000 short tons—*	*1,000 short tons—*
NORTH AMERICA:					
United States:					
Mainland cane	1,620	1,420	1,470	1,830	1,672
Hawaii	1,129	1,041	1,107	1,025	1,049
Puerto Rico	255	290	299	308	273
Total U.S. cane	3,004	2,751	2,876	3,163	2,994
Sugarbeets	3,663	3,197	3,006	4,033	3,905
Total U.S.	6,667	5,948	5,882	7,196	6,899
Caribbean:					
Cuba	5,787	6,393	6,283	6,614	6,393
Dominican Republic	1,259	1,316	1,251	1,300	1,500
Other countries	957	973	897	940	858
Total Caribbean	8,003	8,682	8,431	8,854	8,751
Other Mainland:					
Mexico	3,053	3,125	3,006	3,003	2,976
Canada	161	126	103	132	143
Central America	1,092	1,269	1,451	1,711	1,901
Total Other Mainland	4,306	4,520	4,560	4,846	5,020
Total North America[3]	18,976	19,150	18,873	20,896	20,670
SOUTH AMERICA:					
Argentina	1,426	1,819	1,689	1,487	1,722
Brazil	6,795	7,672	8,157	6,834	8,267
Colombia	898	937	1,001	1,086	972
Peru	1,014	1,125	1,091	1,091	1,058
Venezuela	571	637	584	538	594
Other countries	1,031	1,159	1,281	1,546	1,567
Total South America[3]	11,735	13,349	13,803	12,582	14,180
EUROPE:					
Western Europe:					
E.C.-9					
Belgium-Luxemburg	758	865	683	801	824
Denmark	377	405	457	466	458
France	3,290	3,492	3,250	3,562	3,271
Germany, Fed. Rep. of	2,690	2,707	2,687	2,792	3,014
Ireland	186	208	158	219	208
Italy	1,381	1,250	1,113	1,606	1,929
Netherlands	833	917	856	1,008	1,042
United Kingdom	1,062	1,154	681	768	852
Total E.C.-9[3]	10,577	10,998	9,885	11,222	11,598
Non E.C.					
Austria	428	408	438	564	431
Greece	142	177	206	338	425
Spain	915	899	659	1,030	1,593
Sweden	322	291	336	305	333
Other countries	195	208	190	183	218
Total Non E.C.[3]	2,002	1,983	1,829	2,420	3,000
Total Western Europe[3]	12,579	12,981	11,714	13,642	14,598
Eastern Europe:					
Czechoslovakia	859	947	937	827	772
German Democratic Rep.	794	777	772	716	661
Poland	2,015	2,003	1,716	2,149	2,205
Romania	635	753	618	617	882
Yugoslavia	471	532	611	539	779
Other countries	639	672	656	685	779
Total Eastern Europe[3]	5,413	5,684	5,310	5,533	6,078
Total Europe[3]	17,992	18,665	17,024	19,175	20,676
U.S.S.R.	8,984	10,549	8,521	8,488	8,102
AFRICA:					
Egypt	650	658	595	683	744
Mauritius	756	768	767	547	806
Mozambique	402	430	441	268	386
South Africa	2,111	1,909	2,076	1,986	2,252
Other countries	2,081	2,274	2,382	2,577	2,715
Total Africa[3]	6,000	6,039	6,261	6,061	6,903
ASIA:					
China-Peoples Republic	2,708	2,899	2,646	2,756	2,866
China-Rep. of Taiwan	860	983	828	901	1,102
India	5,040	5,456	6,387	6,019	6,559
Indonesia	981	1,047	1,102	1,157	1,268
Iran	689	734	711	755	827
Japan	716	720	527	519	633
Pakistan	518	701	614	694	744
Philippines	2,673	2,772	2,717	3,260	2,896
Thailand	716	1,025	1,168	1,767	1,985
Turkey	894	811	919	1,087	1,417
Other countries	333	464	476	489	553
Total Asia[3]	16,128	17,612	18,095	19,404	20,850
OCEANIA:					
Australia	3,015	2,923	3,219	3,230	3,738
Fiji Islands	413	386	397	408	324
Total Oceania[3]	3,428	3,309	3,616	3,638	4,062
TOTAL WORLD[3]	83,243	88,673	86,193	90,244	95,443

[1]Crop-year beginning May 1. All campaigns, which begin not earlier than May of one year nor later than April of the following year, are included in the same crop year. Each country's total annual production is credited to the May/April year in which sugar production began.

[2]Estimate.

[3]May not add due to rounding.

E.C. Economic Community.

Source: 1972-1975—U.S. Department of Agriculture, Sugar and Sweetener Report, Vol. 2 (2), February 1977. 1976—USDA Foreign Agricultural Service, Circular FS 2-77, July 1977.

NON-CENTRIFUGAL SUGAR:[1]
Production in Specified Countries, Annual 1972-73/1976-77[2]

(IN THOUSANDS OF SHORT TONS)

Region and Country	1972-73	1973-74	1974-75	1975-76	1976-77[3]
NORTH AMERICA:					
Costa Rica	30	44	44	44	50
El Salvador	11	18	18	18	18
Guatemala	60	55	57	60	93
Mexico	127	127	72	72	72
Nicaragua	13	13	13	11	11
Panama	8	2	2	3	2
TOTAL	248	259	206	208	246
SOUTH AMERICA:					
Brazil	220	220	220	220	220
Columbia	744	772	827	757	948
Ecuador	44	44	44	44	46
Peru	15	14	14	14	15
Venezuela	36	39	44	42	43
TOTAL	1,060	1,089	1,150	1,077	1,272
ASIA:					
Burma	157	143	143	149	152
China, Peoples Rep.	816	904	898	904	909
China, Rep. of (Taiwan)	28	29	28	30	33
India	6,614	7,193	6,724	6,834	6,834
Indonesia	202	165	193	220	220
Japan	14	13	12	13	13
Nansei-Nanpo (Ryukyo)[4]	....	....	....	....	....
Pakistan	1,543	1,520	1,543	1,593	1,598
Philippines	63	66	60	60	56
Thailand	298	386	407	408	772
Vietnam South	11	11	11	11	11
TOTAL	9,744	10,430	10,019	10,222	10,598
WORLD TOTAL	11,053	11,778	11,375	11,507	12,116

NOTE: Due to rounding, may not add to area total.

1Noncentrifugal sugar includes all types of sugar produced by other than centrifugal process which is largely for consumption in the relatively few areas where produced. The estimates include such kinds known as piloncillo, panela, papelon, chancaca, radura, jaggery, gur, muscovado, panocha, etc. 2Years shown are last year's crop-harvesting season. For chronological arrangements here all campaigns which begin not earlier than May of one year, nor later than April of the following year, are placed in the same crop-harvesting year. The entire season's production of each country is credited to the May/April year in which harvesting and sugar production began. 3Preliminary. 4Since January 1, 1972, included in Japan.

Source: USDA Foreign Agricultural Service, Circular FS 2-77, July 1977. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source materials, reports of U.S. Agricultural Attaches and Foreign Service Officers, results of office research and related information.

Continued from page 35

The trading unit, price quotations, minimum fluctuations, daily trading limits, trading period and basic grade are identical to those cited for the No. 12 Contract.

N.Y. TRADING HOURS

Trading hours of the Exchange are: *Domestic Sugar Contract No. 12 - 10:00 a.m. to 2:55 p.m. World Sugar Contract No. 11 - 10:00 a.m. to 3:00 p.m.*

SPOT SUGAR PRICES

DOMESTIC NO. 12 SPOT

The domestic No. 12 spot sugar price is that value established by the Exchange for raw centrifugal cane sugar basis 96 degree polarization and deliverable in North of Hatteras ports (New York, including Yonkers, Philadelphia or Baltimore) and New Orleans (including Gramercy, Burnside and Reserve). Five members of the New York Coffee and Sugar Ex-

change comprise what is called the Spot Domestic Sugar Quotation Committee. In order to represent both buyer's and seller's interest, two committee members are generally selected from refiner interests and three from trade and commission houses.

In setting a spot price for a given day the Quotation Committee is guided by well-established but flexible criteria. The committee takes into consideration not only actual sales of raw sugar but also bids and offers and price changes of nearby futures. "Against Actuals" Trades (a futures transaction involving the simultaneous purchase and sale between two principals of an amount of raw sugar and its equivalent in futures) as well as inter-refiner and inter-operator business are excluded from the committee's consideration.

WORLD NO. 11 SPOT

The world spot price is determined in much the same way as the domestic No. 12 spot price. This quotation reflects the price of raw centrifugal cane sugar, 96 degree polarization, f.o.b. and stowed in bulk at usual delivery ports in the Carribbean, Brazil and other areas. Sales between the first and last days of the month providing for shipment during the same or following two months are considered within the spot delivery range. In the case of bids & offers within the spot range, the spot price may not be set lower than the bid nor higher than the offer, so that if sales had resulted, they would have qualified as spot sales. In the absence of sales, bids & offers, the Spot World Sugar Quotations Committee studies other transactions not strictly falling into the spot range.

Both the Domestic and World Spot Price Quotations are issued by their respective committees at approximately 2:00 p.m. on Exchange business days.

PRICES OF WHITE REFINED SUGAR IN SELECTED COUNTRIES

Representative Prices for Years 1974-1976 (U.S. Cents per Pound)

Countries	Locality	Representative Prices 1974 Wholesale	1974 Retail	1975 Wholesale	1975 Retail	1976 Wholesale	1976 Retail
NORTH AMERICA							
Canada	Montreal	39.8	41.5	29.1	37.0	19.2	24.1
U.S.A.	whole country	32.3	34.4	.....	.....	19.2	24.0
CENTRAL AMERICA							
Belize	Belize	6.8	7.7	5.7	6.5	5.8	6.5
El Salvador	whole country	9.1	10.0	9.1	10.0	14.0	16.0
Guatemala	whole country	7.0	8.0	9.5	11.0	9.5	11.0
Jamaica	whole country	13.0	13.3	14.6	15.3	N.A.	N.A.
Trinidad & Tobago	whole country	12.0	12.5	10.0	.....	N.A.	N.A.
West Indies:							
Barbados	whole country	48.5	60.5	.....	.....	N.A.	N.A.
Leeward Islands:							
St. Kitts-Nevis	whole country	.....	.....	38.0	51.0	N.A.	N.A.
Dominican Republic	whole country	.....	.....	.....	.....	14.8	17.0
Panama	.....	.....	.....	.....	.....	17.9	20.0
SOUTH AMERICA							
Argentina	.....	20.0	22.1	.....	.....	N.A.	N.A.
Bolivia	whole country	15.0	15.5	15.0	15.5	N.A.	N.A.
Brazil	Rio de Janeiro	9.1	9.5	10.8	11.3	13.5	14.0
Chile	Santiago	27.0	28.0	.....	.....	N.A.	N.A.
Colombia	whole country	.....	.....	5.5	7.5	N.A.	N.A.
Ecuador	.....	.....	.....	6.0	6.7	N.A.	N.A.
Guyana	whole country	40.1	43.3	34.5	37.5	N.A.	N.A.
Peru	whole country	6.3	6.6	5.5	5.8	7.8	8.3
Venezuela	whole country	12.2	13.1	.....	.....	N.A.	N.A.
ASIA							
Bangladesh	whole country	27.2	27.7	20.1	20.7	N.A.	N.A.
Hong Kong	whole country	32.6	44.9	.....	.....	N.A.	N.A.
India	Kanpur	11.8	11.9	10.6	10.7	11.0	11.1
Iraq	whole country	.....	.....	.....	.....	19.2	20.1
Israel	whole country	.....	.....	.....	.....	20.0	25.0
Japan	Tokyo	26.9	34.7	38.9	44.7	31.8	40.8
Jordan	Amman	.....	22.2	.....	80.0	20.6	21.2
Korea, Rep. of	Seoul	36.0†	40.0†	47.0	50.0	43.4	45.8
Kuwait	whole country	14.1	15.5	.....	.....	N.A.	N.A.
Philippines	Manila	7.6	9.1	9.3	10.6	9.4	10.7
Saudi Arabia	whole country	.....	.....	16.5	19.4	N.A.	N.A.
Singapore	whole country	13.9	14.8	19.1	19.7	22.1	22.8
Sri Lanka	whole country	.....	.....	.....	84.0	N.A.	N.A.
Syria	whole country	.....	.....	35.7	36.8	33.8	34.5
Thailand	Bangkok	9.6†	10.3†	9.6	10.3	11.7	13.0
EUROPE							
Austria	whole country	11.8	13.7	13.7	16.1	13.8	16.1
Cyprus	whole country	31.7	36.5	.....	.....	.....	.....
Finland	whole country	28.7	36.6	35.7	45.5	45.1	57.4
German Dem. Rep.	whole country	14.4	15.5	14.4	15.5	N.A.	N.A.
Greece	Athens	.....	.....	24.3	30.7	23.8	27.1
Hungary	whole country	.....	.....	67.6	75.1	N.A.	N.A.
Norway	Oslo	50.7	56.4	.....	.....	.....	.....

Continued on Next Page

PRICES OF WHITE REFINED SUGAR IN SELECTED COUNTRIES

Representative Prices for Years 1974-1976 (U.S. Cents per Pound)

Countries	Locality	Representative Prices 1974 Wholesale	1974 Retail	1975 Wholesale	1975 Retail	1976 Wholesale	1976 Retail
EUROPE (continued)							
Portugal	whole country	.....	.....	14.9	16.4	20.0	23.0
Sweden	whole country	21.9	29.8	22.4	32.7	21.3	33.3
Switzerland	whole country	.....	.....	34.5	44.0	N.A.	N.A.
Turkey	Ankara	16.0	18.8	21.3	23.3	20.1	N.A.
Yugoslavia	.....	.....	.....	.....	.....	30.0	33.0
AFRICA							
Burundi	.....	.....	.....	119.4	127.0	38.0†	45.6†
Ethiopia	whole country	15.0	16.0	.....	.....	32.6	36.0
Ghana	.....	17.3	19.4	115.1†	123.7†	N.A.	N.A.
Malagasy Rep.	Tananarive	11.0	14.4	11.2	14.7	10.7	13.0
Malawi	whole country	.....	.....	7.0	11.3	7.0	11.3
Mauritius	whole country	4.0	5.0	4.0	5.0	4.0	5.0
Somalia	whole country	30.8	32.8	.....	.....	N.A.	N.A.
South Africa	Durban	12.5	14.0	12.5	14.0	11.0	12.1
Swaziland	whole country	9.4	14.1	6.4	9.8	6.4	9.8
Tunisia	whole country	17.2	17.7	.....	.....	N.A.	N.A.
OCEANIA							
Australia	major cities	11.5	13.5	12.5	15.0	13.0	16.0
Fiji	main centers	6.3	8.8	8.6	11.0	9.8	11.4
New Zealand	4 main cities	12.5	13.8	18.3	20.2	20.8	22.8
Western Samoa	Apia	.....	.....	66.0	88.0	22.0	31.0

†Whole country

Source: International Sugar Organization, Sugar Year Book, 1976.

NOTE: In recent years the Sugar Manual has included a tabulation of sugar supply and distribution by countries for the current reporting year. Because of the preparation for and conduct of discussions and negotiations for an International Sugar Agreement, the staff of the International Sugar Organization has not completed compilation of supply and distribution statistics for 1976. We, therefore, are not including those statistics in this year's Sugar Manual.

LAMBORN'S SUGAR CHART

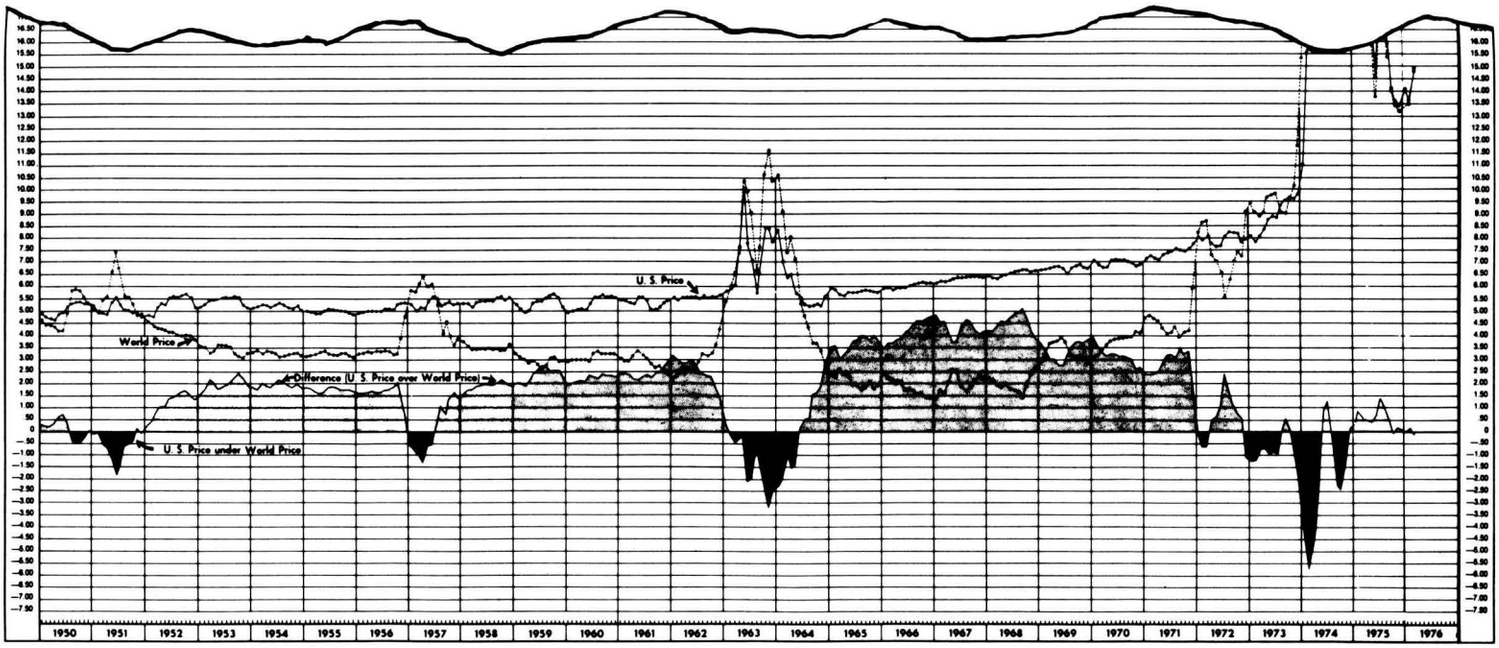
SHOWING COMPARISON OF U. S. AND WORLD PRICE

RAW SUGAR-96°–CENTS PER POUND

Monthly Averages-1950-1976*

YEARLY AVERAGES
(IN CENTS PER POUND)

Calendar Year	U. S. Price (a)	World Price (b)	U. S. Price Over World Price
1976*	14.2275	14.2184	.0091
1975	21.0513	20.4921	.5592
1974	27.4888	29.5976	—2.1108
1973	8.9089	9.5930	—.6841
1972	7.9803	7.4053	.5750
1971	7.3912	4.5219	2.8693
1970	6.9404	3.7542	3.1862
1969	6.7492	3.3708	3.3784
1968	6.5394	1.9790	4.5604
1967	6.3179	1.9920	4.3259
1966	6.0297	1.8579	4.1718
1965	5.7951	2.1177	3.6774
1964	5.9780	5.8631	.1149
1963	7.2818	8.4815	—1.1997
1962	5.5630	2.9671	2.5959
1961	5.3556	2.9129	2.4427
1960	5.3502	3.1407	2.2095
1959	5.3485	2.9671	2.3814
1958	5.4131	3.4980	1.9151
1957	5.3082	5.1589	.1473
1956	5.0945	3.4666	1.6279
1955	4.9983	3.2384	1.7579
1954	5.2072	3.2602	1.9470
1953	5.4237	3.4098	2.0139
1952	5.3532	4.1658	1.1874
1951	5.0899	5.6733	—.6034
1950	5.0878	4.9751	.1127



* To March 31, 1976

(a) For 1971-1976, F.O.B. stowed Greater Caribbean (excluding Brazil) bulk basis.
1951-1970, F.O.B. stowed Greater Caribbean (excluding Brazil) bagged basis.
1950-1950, F.A.S. Cuban bagged basis.

(b) For 1971-1976, based on No. 11 Contract — F.O.B. stowed Greater Caribbean (excluding Brazil) bulk basis.
1951-1970, based on No. 6 Contract — F.O.B. stowed Greater Caribbean (including Brazil) bagged basis.
1950-1950, based on No. 4 Contract — F.A.S. Cuban bagged basis.

★ ★ ★ ★ LAMBORN'S COMPLETE SUGAR BROKERAGE SERVICE ★ ★ ★ ★

Part V

MISCELLANEOUS

GLOSSARY

BAGASSE: Fibrous residue remaining after sugarcane has been milled to extract the sugar-containing juices.

BLACKSTRAP MOLASSES: The final product remaining after all the commercially recoverable sucrose has been removed from the juices expressed from cane. It is a dark colored, heavy, viscous liquid.

BRIX: The measure of density of a solution containing sucrose as determined by a hydrometer.

CALORIE: Unit expressing the energy-producing value of food. A pound of sugar contains 1,790 calories. A standard teaspoon contains 18.

DEXTROSE: A widely occurring crystallizable, simple sugar which contains 6 carbon atoms in contrast to the 12 found in sucrose. It is obtained in commercial quantities by the action of acid on cornstarch. It is less sweet than sucrose.

FRUCTOSE: An alternate chemical name for levulose.

GLUCOSE: (1) An alternate chemical name for dextrose. (2) A name given to corn syrups which are obtained by the action of acids and/or enzymes on cornstarch. Commercial corn syrups are nearly colorless and very viscous. They consist principally of dextrose and another sugar, maltose, combined with gummy organic materials known as dextrins, in water solution.

GUR: Cane juice, concentrated nearly to dryness by boiling over an open fire, without centrifuging and with no purification than by skimming. This ancient process is still used for producing a large share of the sugar consumed in India and some other countries. The crude product is high in glucose and correspondingly low in sucrose.

HIGH FRUCTOSE CORN SYRUP: High fructose corn syrups (HFCS) are produced by the enzymatic conversion of a portion of the glucose in corn syrup to fructose.
Composition of presently available products ranges from 7 to 55% glucose and 42 to 90% fructose on dry solids, the balance being other saccharides. Dry solids average about 71% on total weight. The product is roughly comparable to invert syrup made from sucrose in terms of sweetness and physical properties.

HIGH TEST MOLASSES: A concentrated, clarified cane juice which has been inverted (usually about 2/3) to prevent sucrose from crystallizing at the high concentrations normally employed.

INVERT OR INVERT SUGAR: The mixture of equal parts of dextrose and levulose produced by the action of acid or enzymes on solutions of sucrose.

LEVULOSE: A highly soluble, simple sugar, also containing 6 carbon atoms, it is crystallized with great difficulty, is generally considered sweeter than sucrose, and is used in considerable quantities in combination with dextrose and sucrose in invert sugars.

LIQUID SUGAR: A concentrated solution of refined sucrose or of a mixture of sucrose and invert sugar.

MASSECUITE: A dense mass of sugar crystals mixed with mother liquor, obtained by evaporation.

MOLASSES: The mother liquor separated from sugar crystals in massecuite.

NON-CENTRIFUGAL SUGARS: Crude sugars made from the sugarcane juice by evaporation and draining off the molasses. Among local names are "muscovado," "panocha," and "papelon."

PLANT CROP: The sugarcane crop started with seed pieces (setts).

POLARIZATION: The value (designated as "pol") determined by direct or single polarization of a normal weight solution in a saccharimeter or polariscope. (Based on Spencer and Meade.)

RATOON: Second and subsequent crops grown from the root systems of previous plantings of sugarcane. Usually one or more ratoon crops are harvested before the fields are plowed and replanted.

RAW SUGAR: The impure centrifugal sugar of commerce, a light brown crystalline material, generally containing between 96% and 99% sucrose, plus various impurities and moisture. Other names are "panocha" and "demarara."

SOFT SUGARS: Highly refined, dark-colored, molasses-flavored sugars which are frequently called brown sugars. They contain significant amounts of non-sucrose.

SUCROSE: A sweet crystallizable, colorless sugar which constitutes the principal sugar of commerce. Refined cane and beet sugars are essentially 100% sucrose. Under certain conditions sucrose breaks down to dextrose and levulose.

SYRUP: Concentrated clarified cane juice before crystallization.

TEL QUEL: Literally, such as (it is). When used describing sugar it means "as made," hence of a polarization usually varying among mills and producing areas.

TURBINADO: Direct consumption raw sugar of high polarization which must be dried in a granulator to a very low moisture content.